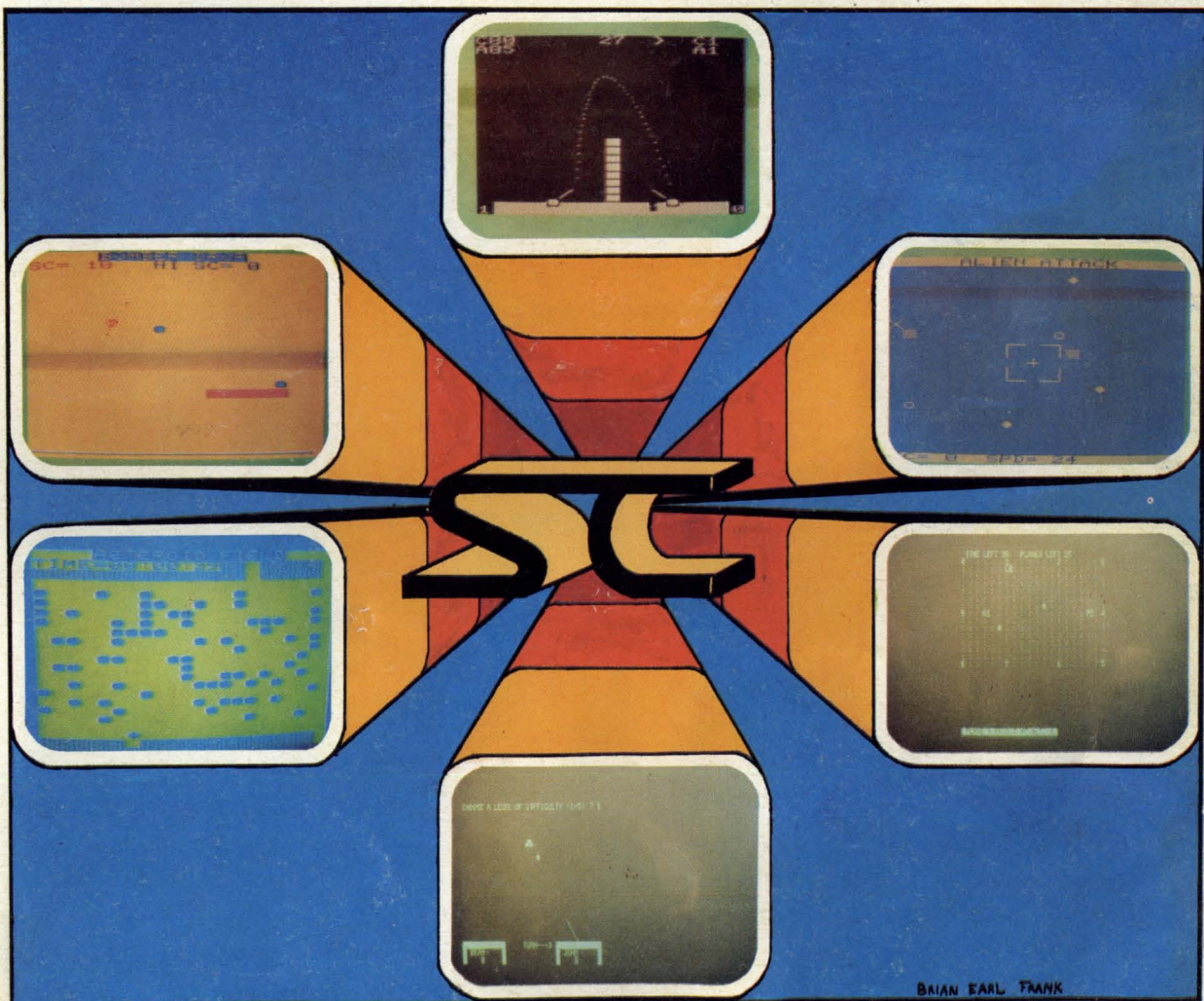


STRICTLY COMMODORE

**PROGRAMS FOR VIC-20
PET, and CBM/SuperPET OWNERS**

March/April 1983

Vol.1 No.2



Games Included In This Issue:

- | | |
|------------------|-------------------|
| ■ Asteroid Field | ■ Airport Tower |
| ■ Alien Attack | ■ Bomber Drop |
| ■ Artillery | ■ Saucer Shootout |

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VIC-20/PET/CBM
VIC-20/PET/CBM
VIC-20/PET
PET/CBM
PET/SuperPET/CBM
VIC-20/PET/CBM

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Contributions in the form of manuscripts with drawings and/or photographs are welcome and will be considered for possible publication. We can assume no responsibility for loss or damage to any material. Payment for the use of any unsolicited material will be made upon acceptance. All contributions should be directed to Submissions Dept., **Strictly Commodore**, P.O. Box 7428, Station E, Calgary, Alberta, Canada T3C 3M2.

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Publisher's Corner

The press run of our first issue was a mere 3,000 copies. Our March/April issue has a press run of 7,000. We expect our May/June issue to hit the 10,000 mark. With **Strictly Commodore** now being distributed through Commodore dealers in both Canada and the United States, we expect our readership to increase dramatically. This should lead to more programs and articles being submitted to our Submissions Dept., which will in turn lead to more material published in **Strictly Commodore**.

In our continuing quest to better serve our readers, we have made several enhancements to **Strictly Commodore**. Among these changes are:

- Typesetting the pages of **Strictly Commodore**.
- A "Random Rumors" column to let our readers know what is happening outside of the Commodore industry but which might indirectly have an effect upon it.
- A new rating system in our "New Products" column. We felt that a three-level system was too general, so we introduced a five-star rating system. This should help our readers make wiser buying decisions.
- A "Book Reviews" column where we review at least 2 books in every issue. With the number of computer books available on the market increasing each day, this column will help you make a more qualified decision on which books to buy.
- More programs designed to run on a more precise equipment configuration. (eg. VIC-20 with SuperExpander cartridge; 32K PET/CBM with disk drive). These programs will take advantage of the unique features available on certain Commodore computers. Nevertheless, we will try to make sure that every issue contains at least four programs that will run on your Commodore computer.
- Companies are now advertising in **Strictly Commodore**.
- A new column entitled "Arcaders Corner." This new column will recognize the best arcaders in the world by listing their high scores on arcade-style games.

We think that you'll find **Strictly Commodore Publishing** easier to read and enjoy. More changes will be implemented in the near future. If you have any comments about our changes or suggestions for further changes then write to Publisher's Corner, **Strictly Commodore** P.O. Box 7428, Station E, Calgary, Alberta, Canada, T3C 3M2.

A call for articles and programs: We're still looking for new interesting programs, informative articles, and programming tips for VIC-20, PET, and CBM/SuperPET computers.

Roger Olanson,
Publisher

Commodore Status Report

There are currently more than one million VIC-20 computers in the world. This makes the VIC-20 the most popular personal computer to date. (On the "Most Widely Sold Computer Systems List", second and third are the Apple II and Timex/Sinclair computers.)

In the year 1982, the three most widely sold computers were the VIC-20, Timex/Sinclair, and the TI-99/4A.

The price war between Commodore, Texas Instruments, and Atari (of computers selling for under \$300) has intensified. The competition has led to the fall of the selling price of the VIC-20 to under \$140 (U.S. funds). With such a drastic drop in the price of the VIC-20, Commodore will most likely forget about the MAX Machine. (Commodore had originally announced a target price of \$180 for its MAX game unit.)

Because of the increased consumer demand of the VIC-20 (over 8,000 mass-merchandising stores sell the VIC-20), Commodore is now manufacturing over 10,000 VIC-20 units per day.

At the Winter Consumer Electronics Show in Las Vegas, Commodore introduced several new products. Among them were: a portable Commodore-64 computer, a hand-held computer, and a full colour printer/plotter.

Commodore introduced the SX-100, which is a portable version of the Commodore-64. The SX-100 comes in a portable case (which is about half the size of the Osborne computer). The top of the case of the SX-100 unlatches and becomes a detachable keyboard. This portable computer has a built in monitor (black and white or colour) and either one or two built-in disk drives. The SX-100 is completely compatible with Commodore-64 software. It folds up into a briefcase which you can take anywhere. It is battery-powered, and when the plug-in cartridge will become available, the SX-100 will be able to use CP/M (the most popular operating system for business programs). Commodore has set the preliminary target price of the black & white, one disk drive system at \$995 (U.S. funds). The colour, two disk drive version will retail for under \$1600 (U.S. funds).

The second new computer introduced by Commodore is the handheld HHC-4 computer. This computer which is about the size of a large calculator, has a QWERTY format keyboard, a separate numeric keypad, a single-line 24-character liquid crystal display, 4K of RAM, 20K of ROM, and uses the BASIC programming language. With an RS-232 interface module, the HHC-4 can be hooked up to printers, cassette recorders, and home computers (VIC-20/Commodore-64). The HHC-4 will sell for \$199 (U.S. funds).

Among the several new peripherals shown by Commodore at the CES was the VIC-1520 four-colour printer/plotter. This new peripheral is designed for use with the VIC-20 and Commodore-64 computers. It uses ball point pens as writing instruments and is capable of high accuracy plotting with .2mm resolution. It can print sideways or lengthwise on 4½-inch wide paper. This printer/plotter can be useful for creating graphs, charts and graphic designs, as well as four-colour text. The retail price will be \$199 (U.S. funds).

Commodore International has for some time, now, been the leading computer company in Europe (mainly in England and West Germany). Commodore is now thinking of setting up manufacturing operations in Britain. This would drastically reduce the selling price of the VIC-20 and the Commodore-64 in Europe and it would give Commodore even more of a competitive edge. (Currently, the VIC-20 is selling in Britain at about twice the price in the United States. Clearly, British consumers would be given a break by such a move.)

The amount of commercial software available for Commodore computers is increasing each day. But besides the large commercial software market, there are also the "public domain programs". (An example of public domain programs are the programs listed in this issue of **Strictly Commodore** - these programs can be typed in, copied, and given to anyone else for free). The public domain programs aren't copyrighted like commercial programs. Most aren't as slick as commercial programs. Commodore had several months ago decided to make as many public domain programs as possible more widely available to the average Commodore computer owner. Dealers have now been sent the complete set of hundreds of public domain programs from Commodore. Schools and other customers can purchase copies of these programs for just the cost of the diskettes and copying.

Commodore has recently established a new speech technology division located in Dallas, Texas. This new division is focusing primarily on making computer voice input and output affordable to Commodore home computer users. In the future, the division will be working on more complex business-orientated projects as well. The division's first goal is to create voice output for Commodore home computers, to allow the computer to speak to the user. (Presumably, this will be something similar to the TI-99/4A computer's speech synthesis module).

People tend to get hooked on the first computer they are trained on. Hence, Commodore, Apple, Atari, and IBM all want to get their computers into schools so that students will influence their parents to buy specific computers, and later on, the graduates will purchase their own computers. Although Apple seems to have the edge in this battle, Commodore is offering special deals to schools and it has been successful in installing a large number of computers in schools.

For those Commodore computer owners who have a modem, CompuServe now offers the Commodore Information Network. This new service allows home computerists to get technical assistance, exchange programming hints and tips, and access new Commodore product information. Commodore employs a full-time editor for the network, and there are now over 1,000 pages of information available. With the purchase of a VICMODEM, Commodore provides a free-one year subscription to CompuServe and one free hour of time on the CompuServe network, thus users have immediate access to the world of telecommunications.

Commodore has started marketing the Commodore-64 through mass retailers. This marketing move means that the price of the Commodore-64 will drop to \$400 (U.S. funds). Coupled with this move is the introduction of the P500 computer. This new computer, also known as the P series, comes with 128K of RAM, 40-column screen, colour graphics, and sound capabilities. The unofficial price of the P500 is \$795 (U.S. funds). Although the P500 has some of the same features as the Commodore-64, it is not yet known whether or not the P500 is software compatible with the Commodore-64.

Random Rumors

Apple has officially introduced two new computer systems, the Apple II E and the Lisa. The Apple II E, with a price of \$1300 (U.S.), comes with 64K RAM, upper and lowercase keyboard, 40 column screen (and an optional 80-column screen), and CP/M capabilities. Apple II E peripherals include 5¼ inch disk drives, printer, and game controllers. The new computer is software compatible with the Apple II +.

The Lisa is a 32/16 bit office microcomputer system and costs \$9995. This new computer offers state-of-the-art simplicity in a flexible and integrated system. Core business applications included with the Lisa are: spreadsheet analysis, word processing, business graphics, graphics design, personal filing, and project management. In addition to these packages, the Lisa runs Basic, Pascal, and Cobol. It will support CP/M and Xenix operating systems, making a library of existing software available. The Lisa comes with one megabyte (1000K) of RAM, two built-in high-sensity 5¼ inch disk drives (which provide 1.7 megabytes of portable mass storage), a 12 inch black-and-white bit mapped screen with a resolution of 364 × 720 (which allows character graphics of 132 columns by 40 rows), and a numeric keypad. The Lisa has been under development since 1979 and over \$50 million was spent on hardware and software research and development. This machine will be directed to the large-corporation marketplace, traditionally dominated by IBM.

Atari has just introduced their new top of the line computer, the 1200XL. The price tag for this computer is approximately \$899 and it is compatible to their previous 400 and 800 series. New features include an additional graphics mode, improved circuitry for sharper sound and colors, and the transfer of all ports and plugs from the front side of the computer to the rear. Also, the four new function keys can act as 12 keys – alone or with SHIFT/CTRL keys. It has 250 available colors for a monitor, and a speaker with four voices including a 3½ octave range. We feel that Atari's stylish 1200XL, will become a main contender in the microcomputer industry.

A new computer has come out into the market for less than \$100. The Texas Instrument's TI-99/2 has calculator-style, rubber keyboard, with a 4.2K of RAM, expandable to 36.2K. However, it does lack color, sprite graphics, and sound, compared to it's older cousin, the TI-99/4A. The most interesting thing about the TI-99/2 is it is the first 16 bit chip computer for under \$100.

Texas Instrument's other new computer, Compact Computer 40, is a \$250 hand-holdable battery unit. Its features include 4K of RAM (expandable to 16K), 34K of ROM containing enhanced BASIC, a 31 character liquid crystal display that scrolls sideways to 80 characters, upper and lower case, QWERTY keyboard, memory retention when switched off, and a cartridge slot for plug in software.

Another new computer is the Timex/Sinclair 2000 which is the first computer that offers 48K RAM for under \$200. The Timex/Sinclair 2000's main improvements over its popular predecessor, the Timex/Sinclair 1000, has more memory, color, and sound. There are 40 rubber keys with upper-and lower-case, auto-repeat, standard Sinclair character graphics, one-touch BASIC keyword entry, and the same editing functions as the Timex/Sinclair 1000. Separate keys control the colors of the screen foreground, background, and borders, with variable brightness and a FLASH command for blinking characters. A one-channel sound generator beeps through an internal speaker over ten octaves. Other Timex/Sinclair 2000 features include a 16K extended BASIC, 256- by 192-pixel high resolution graphics, high-speed cassette interface and a 32-column by 24-line text display. The Timex/Sinclair 2000 is available for \$119.95 (16K) or \$149.95 (48K).

Attention Programmers

We suspect that many potential best selling programs are lurking in the back of someone's Commodore computer, and even more are lurking in the back of somebody's mind. Either way, they're not doing anyone much good.

If you have an interesting (and even possibly addictive) program - whether it is recreational, educational, or business - send it to us along with good documentation (typed double-spaced if possible) and a list of variables. If we think its good, we'll publish it in **Strictly Commodore**. Payment will be made upon acceptance of program.

Send your programs on disk or tape along with documentation to **Strictly Commodore**, at the below address.

Attention Authors

Strictly Commodore is actively seeking well written , informative articles and software reviews for the VIC-20, PET, CBM, and SuperPET microcomputers. This is a chance for authors as well as users to make some money to help pay for their computer addiction and get their efforts out where they can be appreciated.

There are more and more consumer-oriented products on the market for Commodore owners - new computers, peripherals, software, etc. With this in mind, we are looking for articles and product reviews that would be of interest to **Strictly Commodore** readers. If you have such an article or review, send it to us and it will be considered for possible publication. Payment for the use of any material will be made upon acceptance.

When writing articles and reviews, please keep in mind our criteria, which now includes the following considerations:

- The article should be useful to a large number of our readers.
- The article should be presented in a clear, readable style.
- If it is a product review, the product should be readily available.
- Reviewers should take into consideration all aspects of a particular software package.

Authors should send their articles to:

Strictly Commodore
Submissions Dept.
P.O. Box 7428 Station E,
Calgary, Alberta,
Canada T3C 3M2

Contributions in the form of manuscripts with drawings and/or photographs are welcome and will be considered for possible publication. We can assume no responsibility for loss or damage to any material. Payment for the use of any unsolicited material will be made upon acceptance. All contributions should be directed to Submissions Dept., **Strictly Commodore**, P.O. Box 7428, Station E, Calgary, Alberta, Canada T3C 3M2.

Programming Hints & Tips

Doing Integer Division With Remainders

If you want to do integer division with remainders, type in the following short program:

```
10 INPUT "DIVIDEND";X
20 INPUT "DIVISOR";Y
30 QUOTIENT = INT(X/Y)
40 R = X - Y * QUOTIENT
50 PRINT "THE ANSWER IS:"
60 PRINT "THE QUOTIENT = ";QUOTIENT;"    REMAINDER = ";R
```

This program should be self-explanatory, with line 40 being the only line which is a little more complicated. All that line 40 does is that it calculates the remainder after knowing what the QUOTIENT is.

Is A Number Even or Odd

The fastest way that a computer knows if a number is even or odd is by using the AND command. This program shows you how the AND command functions:

```
10 INPUT "NUMBER";NUM
20 X = NUM AND 1: IF X = 0 THEN PRINT "THE NUMBER IS EVEN.":END
30 PRINT "THE NUMBER IS ODD."
```

These three lines can easily be incorporated in a program subroutine to quickly tell if a number is odd or even.

A Quick RUN Command

To initiate the RUN command quickly (and even one-handed), just type in a letter and then shift the RUN/STOP key. After a quick flash of an error, your program will then RUN. An example of what the computer will show on the screen (if you press the "X" key first):

```
XLOAD
? SYNTAX ERROR
READY
RUN
```

An important thing to keep in mind when using this quick RUN method is to never type in a number before shifting the RUN/STOP key. This will result in a new line being added to your program, or in an old line being changed.

For VIC-20 owners who want to see a strange equivalent of the RUN command, type SYS 50830.

Using Time Delay Loops

The "time delay loop" is an advanced BASIC programming technique used to control the speed of any program. This technique, also known as a "waiting loop", is usually just one line in length and looks something like this:

```
150 FOR X = 1 TO 1000: NEXT X
```

The number 1000 in the line statement just tells the computer to count to 1000 (or whatever number is specified) before proceeding to the next line statement. If the number is larger, the computer will take a longer time to count than if the number is smaller.

Time delay loops have many uses in advanced BASIC programming. For example, they can be used with musical sound effects (see an example later on in this column), or when displaying an object on the screen for a specified amount of time.

Using the GET Statement

When you are using the GET statement, it can sometimes be troublesome that the computer remembers up to the last 10 keys pressed. To solve this problem, just before you use a GET statement put in the following line:

```
100 GET A$: IF A$="" THEN 100
```

This is a straight forward routine which just reads every character out of the keyboard so that you start your GET statement (or INPUT statement) with a clear slate.

Using Sound Effects

For those of you who are keen on learning about your Commodore computer's sound capabilities, here is a short program that will let you experiment endlessly:

PET/CBM/SuperPET Version:

```
10 M = 5: PRINT "PRESS 'Q' OR I WILL SOON DIE !!!!!!"
20 FOR X = 144 TO 147: POKE 59467,X: POKE 59466,X: POKE 59465,X: POKE 59464,X
30 M = M + 4: FOR T = 1 TO M:NEXT T: POKE 59467,0
35 FOR PAUSE = 1 TO 200: NEXT PAUSE
40 GET T$: IF T$="" THEN 20
50 PRINT: PRINT "THANK YOU"
```

VIC-20 Version:

```
10 POKE 36878,15: M = 1: PRINT "PRESS 'Q' OR I WILL SOON DIE !!!!!!"
20 FOR X = 130 TO 220 STEP 5: POKE 36874,X: POKE 36875,X: POKE 36876,X: POKE 36877,X
30 M = M + 1: FOR T = 1 TO M:NEXT T:NEXT X: POKE 36874,0: POKE 36875,0: POKE 36876,0: POKE 36877,0
35 FOR PAUSE = 1 TO 400: NEXT PAUSE
40 GET T$: IF T$="" THEN 20
50 PRINT: PRINT "THANK YOU"
```

Explanation of this sound effects program:

Line 10: Introduction of the program. The variable "M" stands for the amount of time that the computer will "scream".

Line 20: Activate all the computer's voices.

Line 30: Keep the computer's voices on for a certain amount of time, then shut them off.

Line 35: Brief interval between "screams".

Line 40: Is the program ending? If no, then the computer continues "screaming".

Line 50: The program ends.

For those of you who are really interested in exploring the endless possibilities of sound effects, try to change a few values in the program, see the results, and try new changes, etc.

Four Hidden VIC-20 Symbols

The VIC-20 computer has a few symbols that don't seem to be documented anywhere. There are four special graphic symbols which are not inscribed on the VIC-20 keyboard. These are listed in the character POKE chart on page 141 of the owner's manual, but they are not listed in the CHR\$ chart.

The four graphic symbols can be accessed only when in upper/lower case mode (which you can get by pressing the Commodore and SHIFT keys simultaneously).

Besides being able to type the appropriate key, you can POKE their value or PRINT a CHR\$ code.

Character Accessed By	POKE Value	CHR\$ Values
SHIFT @	122	186 or 250
COMM *	95	127 or 223
SHIFT £	105	169 or 233
SHIFT ◁	94	126 or 222

Soft Reset On the VIC-20

If you want to do a soft reset on the VIC-20, just type: SYS 64802. This is the equivalent of turning your VIC off and then back on. This command is an easy way of clearing up all the funny POKEs that you've been doing.

Two Quick VIC-20 Tips

By typing in POKE 650,128, all of the keys on the VIC-20 will repeat.

To disable the LIST command, just add a line to POKE 775,200. If you want to restore the LIST function, type in POKE 775,199.

Changing Screen Modes for CBM/SuperPET

There are two POKE commands to switch from one screen mode to the other. To be in graphics mode (upper case letters and the graphic characters), the command is POKE 59468,12. To be in the business mode (upper/lower case letters), the command is POKE 59468,14.

To quickly condense an 80-column screen by eliminating spaces between lines, just PRINT CHR\$(142). This command will also automatically put you in the graphics screen mode. Another way of achieving the same result is to press the shift-lock key, the SHIFT key (on the right-hand side of the keyboard), and the "2" key (on the keyboard and not the one on the numeric keypad).

Using the END Statement

All BASIC programs which are to be stored on cassette should be terminated with an END statement. This is especially important if the cassettes have been repeatedly over-written. Failure to do this will eventually lead to garbage being loaded with saved programs. Some programs that do not terminate with the END statement will LOAD and LIST normally, but they might also contain fragments of a second copy of the program overlaying the first.

Although most reference manuals say that the END statements are optional for BASIC programming, if you are using and reusing inexpensive tapes then END statements will solve most of your SAVEing problems.

If programs are to be stored on disk or if they are to be stored on clean tapes, then using the END statement will have no effect upon them.

The easiest way to remember terminating your programs with an END command is
59999 END

Look for more programming hints and tips in future issues of **Strictly Commodore**.

If you have recently run across a programming hint or tip and would like to share it with other readers, then send your name and address along with the information to:

Programming Hints and Tips
Strictly Commodore Publishing
P.O. Box 7428, Station E
Calgary, Alberta,
Canada T3C 3M2

We will give a \$50 software certificate to the best programming hint received this year.

Program Section

Asteroid Field- You are the pilot of a damaged interstellar cargo shuttle and you must cross a dangerous asteroid field to reach a stellar port. Since your shuttle lacks sophisticated lasers, you must rely on your expert maneuvering capabilities to reach your destination.

Alien Attack- As a Star Fleet pilot, your job is to eliminate the enemy fighter craft in your sector. You rely on your Starfighter jet's lasers and accurate radar to accomplish this task.

Saucer Shootout- This educational program uses an arcade style game to teach students percentage problems. In this Two-player game each student must correctly answer a percentage question before he is given a chance to shoot at the flying saucers which zoom across the screen. (For PET/CBM computers)

Bomber Drop- As the leader of a small alien community, you must prevent the "nuclear egg fallout" from reaching your town. If you let a nuclear egg hit the ground, your entire community will be instantly vaporized.

Artillery- In this two-player trajectory game each player attempts to destroy his opponent's mortar. Each player chooses the charge and angle of his shot while taking into account the speed and direction of the wind and the overall distance between the two mortars. (For VIC-20 computers with Super Expander cartridge)

Airport Tower- As an air traffic controller, your job is to ensure that all planes and jets entering your district get to their desired destinations. Planes might take off, land, turn, run out of fuel, and crash in mid air with other planes. Only a skilled controller will successfully finish his shift. (For 40-column PET computers)

Asteroid Field

In Asteroid Field, you are the pilot of an interstellar cargo shuttle. You were on your way to deliver ion engine parts to Zargon-9 when your hyper-drive malfunctioned and you were left stranded in the middle of nowhere.

Fortunately for you, there is a stellar port only 500,000 miles away. The stellar port has all the equipment and personnel needed to repair your shuttle and send you on your way to your original destination.

But before reaching the stellar port you must cross a dangerous asteroid field. Since your shuttle is not armed with sophisticated lasers, you must rely on your expert maneuvering skills to reach safety.

Your life support systems (food, oxygen, fuel) are quickly being depleted so you must reach the stellar port as soon as possible.

To maneuver your shuttle, use your numeric keypad 1,2,3,4,6,7,8,9 keys (or the I,J,K,M keys on the VIC-20). There are five skill levels to choose from.

The following is a list of the important variables used in Asteroid Field:

Variables:

SK	skill level
H%,W%	current coordinates of your shuttle
A1	value used for animation in POKEs
A2	screen width
H\$	string needed to print asteroids appearing on the screen.
H%(),W%()	moving your shuttle in a specified direction
Z,X1,X2	variables needed to print the first asteroids
TT\$	time that has passed since you started the game
KEY	what key on the keyboard is being pressed
OH%,OW%	old coordinates of your shuttle

VIC-20 Version

```

4 REM: *** INITIALIZATION ***
5 POKE36879,222:CLR:PRINT"  ASTEROID FIELD  ":DIMHX(32),WX(32)
10 INPUT"SKILL LEVEL (1-5)  ";T$
15 SK=VAL(T$):IFSK<1ORSK>5THENPRINT"  ":GOTO10
20 HX=21:WX=7:A1=7679:A2=22:A3=32:A4=90
25 H$=" "
27 HX(0)=-1:WX(0)=0:HX(24)=1:WX(24)=0:HX(8)=0:WX(8)=-1:HX(32)=0:WX(32)=1
30 PRINT"  ASTEROID FIELD  "
40 PRINT"TIME=00:00:00  "
50 PRINT" "
60 FORX=1TO16
70 PRINT"  ":NEXTX
80 PRINT" "
90 PRINT"  ":TI$="000000"
93 Z=INT(50+SK*40)
95 FORX=1TOZ:X1=INT(RND(1)*21+1):X2=INT(RND(1)*15+4)
97 POKEA1+X1+X2*A2,81:NEXTX
99 REM: *** MOVING THE ASTEROID BELT ***
100 TT$=LEFT$(TI$,2)+" "+MID$(TI$,3,2)+" "+RIGHT$(TI$,2):PRINT"TIME=":TT$
110 FORN=5TO19:IF(RND(1)+(SK/10))<.4THEN190
130 POKEA1+N*A2-1,A3:POKEA1+HX*A2+WX,A3:PRINTLEFT$(H$,N);" "
140 IF(RND(1)+(SK/20))<.9THEN160
150 PRINTLEFT$(H$,N);" "
160 IFPEEK(A1+HX*A2+WX)=81THENGOTO1000
170 POKEA1+HX*A2+WX,A4
180 IFTI>(TT+SK*8)THENGOSUB500
190 NEXTN:GOTO100
499 REM: *** MOVING YOUR SHIP ***
500 KEY=PEEK(197):IFKEY<12ORKEY>44THENRETURN
530 OHX=HX:OWX=WX:HX=HX+HX*(KEY-12):WX=WX+WX*(KEY-12)
550 IFWX>21ORWX<1THENWX=OWX

```



```

570 IFPEEK(A1+H%*A2+W%><A3)THENH%=OH%:W%=OW%
580 POKEA1+OH%*A2+OW%,A3:POKEA1+H%*A2+W%,A4:IFH%<2THEN2000
590 TT=TI:RETURN
999 REM: *** YOU DIED ***
1000 PRINT"YOU COLLIDED WITH AN"
1004 PRINT"ASTEROID AND YOUR"
1007 PRINT"SHUTTLE WAS DESTROYED."
1010 FORX=1TO30:GETT$:NEXTX
1020 GOTO2030
1999 REM: *** YOU MADE IT THROUGH THE ASTEROIDS ***
2000 PRINT"TIME="TT$
2005 FORX=1TO30:GETT$:NEXTX
2010 PRINT"CONGRATULATIONS, YOU"
2015 PRINT"HAVE SUCCESSFULLY"
2020 PRINT"PASSED THROUGH THE"
2025 PRINT"ASTEROID FIELD."
2030 PRINT"DO YOU WANT TO TRY"
2035 PRINT"AGAIN (Y/N)";
2040 INPUT"  Y";T$
2050 IFT$="Y"THEN5
2060 IFT$<>"N"THENPRINT" ";:GOTO2030
2070 PRINT"TIME="TT$:END

```

CBM/SuperPET Version

```

4 REM: *** INITIALIZATION ***
5 PRINTCHR$(142):CLR:PRINT"  ASTEROID FIELD"
10 INPUT"SKILL LEVEL (1-5)  1";T$
15 SK=VAL(T$):IFSK<1ORSK>5THENPRINT" ";:GOTO10
20 H%=21:W%=7:A1=32767:A2=80:A3=32:A4=90
25 H$="XXXXXXXXXXXXXXXXXXXX"
27 RESTORE:FORX=1TO9:READH%(X),W%(X):NEXTX
30 PRINT"  ASTEROID FIELD"
40 PRINT"TIME=00:00:00"
50 PRINT" "
60 FORX=1TO18
70 PRINT" "
80 PRINT" "
90 PRINT" ";TI$="000000"
93 Z=INT(50+SK*40)
95 FORX=1TO2:X1=INT(RND(1)*39+1):X2=INT(RND(1)*15+4)
97 POKEA1+X1+X2*A2,81:NEXTX
99 REM: *** MOVING THE ASTEROID BELT ***
100 TT$=LEFT$(TI$,2)+": "+MID$(TI$,3,2)+": "+RIGHT$(TI$,2):PRINT"TIME=";TT$
110 FORN=5TO19:IF(RND(1)+(SK/10))<.4THEN190
130 POKEA1+N*A2-41,A3:POKEA1+H%*A2+W%,A3:PRINTLEFT$(H$,N);" "
140 IF(RND(1)+(SK/20))<.9THEN160
150 PRINTLEFT$(H$,N);" "
160 IFPEEK(A1+H%*A2+W%)=81THENGOTO1000
170 POKEA1+H%*A2+W%,A4
180 IFTI>(TT+SK*8)THENGOSUB500
190 NEXTN:GOTO100
499 REM: *** MOVING YOUR SHIP ***
500 KEY=PEEK(151):IFKEY<177ORKEY>185THENRETURN
530 OH%=H%:OW%=W%:H%=H%+H%(KEY-176):W%=W%+W%(KEY-176)

```



```

550 IFW%>380RW%<1THENW%=0W%
570 IFPEEK(A1+H%*A2+W%)<>A3THENH%=0H%:W%=0W%
580 POKEA1+0H%*A2+0W%,A3:POKEA1+H%*A2+W%,A4:IFH%<2THEN2000
590 TT=TI:RETURN
999 REM: *** YOU DIED ***
1000 PRINT"YOU COLLIDED WITH AN ASTEROID AND"
1005 PRINT"YOUR SHUTTLE WAS DESTROYED"
1010 FORX=1TO30:GETT$:NEXTX
1020 GOTO2030
1999 REM: *** YOU MADE IT THROUGH THE ASTEROIDS ***
2000 PRINT"TIME="TT$
2005 FORX=1TO30:GETT$:NEXTX
2010 PRINT"CONGRATULATIONS, YOU HAVE SUCCESSFULLY"
2020 PRINT"PASSED THROUGH THE ASTEROID FIELD."
2030 PRINT"DO YOU WANT TO TRY AGAIN (Y/N)"
2040 INPUT"Y/N":T$
2050 IFT$="Y"THEN5
2060 IFT$<>"N"THENPRINT" ":GOTO2030
2070 PRINT"TIME="TT$:END
3000 DATA 1,-1,1,0,1,1,0,-1,0,0,0,1,-1,-1,-1,0,-1,1

```

"Asteroid Field" PET Version:

The following lines have to be changed or added to the CBM/SuperPET listing of Asteroid Field:

```

6 DIMH%(24),W%(24)
20 H%=21:W%=7:A1=32767:A2=40:A3=32:A4=90
27 H%(0)=1:W%(0)=0:H%(24)=-1:W%(24)=0:H%(8)=0:W%(8)=1:H%(16)=0:W%(16)=-1
500 KEY=PEEK(515):IFKEY<29ORKEY>53THENRETURN
530 OH%=H%:OW%=W%:H%=H%+H%(KEY-29):W%=W%+W%(KEY-29)

```

Line 3000 is not needed so therefore it should be deleted. In line 130, the first part of it must be changed to read: POKE A1 + N × A2 - 1,A3. The rest of line 130 should be typed in as it is listed in the CBM/SuperPET version of Asteroid Field.

Alien Attack

In this game you are a star fleet pilot in an enemy galaxy. Your job is to eliminate the oncoming waves of alien fighter crafts. Your ship is equipped with an accurate radar and sophisticated lasers.

The radar on the screen shows you where the aliens are in relation to your ship. As they come closer or move farther away, the shapes of their spacecrafts change.

To destroy an alien spacecraft, you must press the space bar when it's in your sight. If the laser hits the alien, and the alien is in front of you, then the alien is dead. But if the alien gets in your sight, and he is behind you, then he will automatically shoot and kill you.

To control your ship, you need to use the following ten keys: space bar, Q,W,E,R,C,I,J,K, and M. You move your sight with the I,J,K, and M keys. To fire, press the space bar. E and W increase and decrease your speed. R reverses the direction of your ship. By pressing the Q key, you can temporarily stop the game. Pressing the C key will then continue the game.

After clearing an entire wave of aliens, you must press the Q key to continue.

The following is a list of the important variables used in Alien Attack:

Variables:

NE%	maximum number of enemies on the screen
SC	current score
SP%	current speed of your ship
SP%()	speeds of alien spacecrafts
ST%()	current status of aliens(behind or ahead)
H(),W()	coordinates of each alien
OL%()	old peek location where alien appeared
RD%	relative distance between an alien and your ship
P%	what does the enemy look like on the screen?
DE%	is the human dead?
KY%	value of the key being pressed
H%,W%	the value of KY% conveted into movement of your ship's sight
P	value needed to do animation on the screen

VIC-20 Version

```

5 CLR:PRINT"J      ALIEN ATTACK";SPX=24
10 INPUT"如何种 OF ENEMIES (3-9)  3";T$
15 NE% = VAL(T$): IF NE% < 3 OR NE% > 9 THEN 10
20 PRINT"J      ALIEN ATTACK": FORX = 1 TO 21
30 PRINT"  "      "": NEXTX
35 PRINT"SC=";SC: SPD="": SPX:
40 POKE7886,240: POKE7887,192: POKE7889,192: POKE7890,238
50 POKE7908,221: POKE7912,221: POKE7932,219: POKE7952,221: POKE7956,221
60 POKE7974,237: POKE7975,192: POKE7977,192: POKE7979,253
70 FORX = 1 TO NE%: SPZ(X) = INT(RND(1)*11+1)+13
80 STZ(X) = 1: H(X) = INT(RND(1)*20+2): W(X) = INT(RND(1)*22+1)
90 OLX(X) = 160: RDZ(X) = INT(RND(1)*60-30): NEXTX
100 FORLOOP = 1 TO NE%: IFRND(1) > .4 THEN GOSUB 500
110 IF STZ(LOOP) = 0 THEN 290
120 RDZ(LOOP) = RDZ(LOOP) - SPX + SPZ(LOOP)
130 IFRDZ(LOOP) > 50 THEN STZ(LOOP) = 3: PZ = 209: GOTO 200
140 IFRDZ(LOOP) > 25 THEN STZ(LOOP) = 2: PZ = 219: GOTO 200
150 IFRDZ(LOOP) > 0 THEN STZ(LOOP) = 1: PZ = 230: GOTO 200
160 IFRDZ(LOOP) < -50 THEN STZ(LOOP) = -3: PZ = 171: GOTO 200
170 IFRDZ(LOOP) < -25 THEN STZ(LOOP) = -2: PZ = 215: GOTO 200
180 IFRDZ(LOOP) < 0 THEN STZ(LOOP) = -1: PZ = 214
200 POKE7679+INT(W(LOOP))+INT(H(LOOP))*22,OLZ(LOOP)
210 H(LOOP) = H(LOOP) + RND(1)*(H2*2) + (RND(1)*2-1): IF H(LOOP) < 1 THEN H(LOOP) = 1
220 IF H(LOOP) > 21 THEN H(LOOP) = 21
230 W(LOOP) = W(LOOP) + RND(1)*(W2*2) + (RND(1)*2-1): IF W(LOOP) < 1 THEN W(LOOP) = 1
240 IF W(LOOP) > 22 THEN W(LOOP) = 22
250 OLZ(LOOP) = PEEK(7679+INT(W(LOOP))+INT(H(LOOP))*22)
260 IF OLZ(LOOP) = 209 OR OLZ(LOOP) = 216 OR OLZ(LOOP) = 230 THEN OLZ(LOOP) = 162

```



```

130 IF RD%(LOOP)<-150 THEN RD%(LOOP)=-150
140 ST%(LOOP)=X%*RD%(LOOP)+150:P%=X%*ST%(LOOP)+3)
200 POKE32767+INT(W%*LOOP)+INT(H%*LOOP)*80,OL%(LOOP)
210 H%(LOOP)=H%(LOOP)+RND(1)*(H%*2)+(RND(1)*2-1):IF H%(LOOP)<1 THEN H%(LOOP)=1
220 IF H%(LOOP)>21 THEN H%(LOOP)=21
230 W%(LOOP)=W%(LOOP)+RND(1)*(W%*2)+(RND(1)*2-1):IF W%(LOOP)<1 THEN W%(LOOP)=1
240 IF W%(LOOP)>39 THEN W%(LOOP)=39
250 OL%(LOOP)=PEEK(32767+INT(W%*LOOP))+INT(H%*LOOP)*80)
260 FOR X=0 TO 6:IF OL%(LOOP)=X%*2 THEN OL%(LOOP)=160
280 NEXT X:POKE32767+INT(W%*LOOP)+INT(H%*LOOP)*80,P%
290 IF INT(H%*LOOP)=11 AND INT(W%*LOOP)=20 AND ST%(LOOP)<0 THEN ENDE%=1
300 NEXT LOOP:IF DE%>1 THEN 100
310 PRINT"SCORE YOU HAVE JUST BEEN KILLED."
320 PRINT"DO DO YOU WANT ANOTHER GAME (Y/N)"
330 GET T$:IF T$="" THEN 330
340 IF T$="Y" THEN 5
350 IF T$<"N" THEN 330
360 PRINT"FINAL FINAL SCORE=";SC:END
500 KY%=PEEK(151):W%=0:H%=0
510 IF KY%>81 THEN 530
515 Z%=0:FOR X=1 TO NE%:IF ST%(X)=0 THEN Z%=Z%+1
520 NEXT X:IF Z%=NE% THEN 1000
527 KY%=PEEK(151):IF KY%>67 THEN 515
530 IF KY%>82 THEN 550
540 FOR X=1 TO NE%:RD%(X)=-RD%(X):NEXT X
550 IF KY%>32 THEN 630
560 FOR X=10 TO 16 STEP -1:P=32767+11*80+X*80+(20-X):POKE P,206
570 IF X=10 THEN POKE P+80-1,160
580 P=P+2+((X-1)*2):POKE P,205:IF X=10 THEN POKE P+80+1,160
590 NEXT X:POKE33825,237:POKE33829,253:POKE P,160:POKE P-2,160:SC=SC-1
600 FOR X=1 TO NE%
610 IF INT(H%(X))=11 AND INT(W%(X))=20 AND ST%(X)>0 THEN ST%(X)=0:SC=SC+30
620 NEXT X:POKE33667,219:PRINT"SCORE SCORE=";SC;
630 IF KY%=87 THEN SP%=SP%-2:IF SP%<16 THEN SP%=16
640 IF KY%=69 THEN SP%=SP%+2:IF SP%>34 THEN SP%=34
650 PRINT"SCORE SCORE=";SC;" SPD=";SP%;
660 H%=0:W%=0:IF KY%=73 THEN NH%=-1
670 IF KY%=77 THEN NH%=1
680 IF KY%=74 THEN NW%=-1
690 IF KY%=75 THEN NW%=1
700 RETURN
999 REM: END OF WAVE OF ENEMIES
1000 PRINT"WAVE SQUADRON DESTROYED.█":FOR PAUSE=1 TO 1000:NEXT PAUSE
1010 GOTO 20

```

"Alien Attack" PET Version:

The following lines have to be changed from the CBM/SuperPET listing of Asteroid Field:

```

40 POKE33144,240:POKE33145,192:POKE33147,192:POKE33148,238
50 POKE33184,221:POKE33188,221:POKE33226,219:POKE33264,221:POKE33266,221
60 POKE33304,237:POKE33305,192:POKE33307,192:POKE33308,253
200 POKE32767+INT(W%*LOOP)+INT(H%*LOOP)*40,OL%(LOOP)

```



```

250 OL%(LOOP)=PEEK(32767+INT(W(LOOP))+INT(H(LOOP))*40)
280 NEXTX:POKE32767+INT(W(LOOP))+INT(H(LOOP))*40,P%
500 KY%=PEEK(515):W%=0:H%=0
510 IFKY%<>64THEN530
515 Z%=0:FORX=1TONE%:IFST%(X)=0THENZ%=Z%+1
527 KY%=PEEK(151):IFKY%<>67THEN515
530 IFKY%<>55THEN550
550 IFKY%<>6THEN630
560 FORX=10TO1STEP-1:P=32767+11*40+X*40+(20-X):POKEP,206
570 IFX<10THENPOKEP+40-1,160
580 P=P+2+((X-1)*2):POKEP,205:IFX<10THENPOKEP+40+1,160
590 NEXTX:POKE33304,237:POKE33308,253:POKEP,160:POKEP-2,160:SC=SC-1
630 IFKY%=56THENSP%=SP%-2:IFSP%<16THENSP%=16
640 IFKY%=63THENSP%=SP%+2:IFSP%>34THENSP%=34
660 H%=0:W%=0:IFKY%=53THENH%=-1
670 IFKY%=29THENH%=1
680 IFKY%=45THENW%=-1
690 IFKY%=37THENW%=1

```

Line 3 is not needed so therefore it should be deleted. In line 620, the first part of it must be changed to read: NEXT X: POKE 33226,219. The rest of line 620 should be typed in as it is listed in the CBM/SuperPET version of Alien Attack.

The four graphic symbols can be accessed only when in upper/lower case mode (which you can get by pressing the Commodore and SHIFT keys simultaneously).

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Saucer Shootout

This program is a two-player arcade-style game that also teaches students math. Each player must first correctly answer a percentage problem before he gets a chance to shoot at the flying saucers. There are five levels of difficulty to choose from. The number of shots you get depends on which levels of difficulty of problems is correctly answered. Level one allows you one shot, level two allows you two shots, etc. The first player to shoot down ten saucers wins the game. To shoot at the flying saucers, just press the space bar.

To change the difficulty of the randomly-generated percentage problems, just change the values of PERCENTAGE and NUMBER variables in lines 530-620.

The following is a listing of the major variables used in Saucer Shootout:

Variables:

SPACE(),TURN\$()	it shows who's turn it is
V3	width of computer screen
V6	value used for screen animation
H\$,S\$	printing the flying saucer on the screen
NAME\$	names of two players
NUMBER()	the number of saucers destroyed by each player
LEVEL	which skill level was chosen
PERCENTAGE,NUMBER	two random values of each percentage problem
PROPER	the correct answer to the percentage problem
ANSWER	the answer typed in by the player
SHOT	is a shot being fired at a flying saucer?
MAXIMUM	the number of shots a player has not yet used
HEIGHT,WIDTH	coordinates of the flying saucer
WAY	is the saucer moving to the left or right?
HIGHT,WDTH	coordinates of shot

CBM/SuperPET Version

```
9 REM: *** INITIALIZATION ***
10 PRINTCHR$(142):REM: FOR CBM MACHINES
20 CLR:PRINT"  ";TAB(12);"  SAUCER SHOOTOUT  "
30 SPACE(1)=13:SPACE(2)=21
40 TURN$(1)("<---":TURN$(2)(">---")
50 PRINT"  "
60 V1=32:V2=37:V3=80:V4=252:V5=254:V6=32767
70 H$="  " : S$=CHR$(254)+CHR$(252)
80 S$="  "+S$+"  "+S$+"  "+S$+"  "
99 REM: *** INSTRUCTIONS ***
100 PRINT:SAUCER SHOOTOUT IS A TWO-PLAYER"
110 PRINT"ARCADE-STYLE GAME THAT TEACHES MATH."
120 PRINT"THE PROBLEMS IN THIS PROGRAM ASK YOU TO"
130 PRINT"FIND THE PERCENT OF A NUMBER. THERE ARE"
140 PRINT"FIVE LEVELS OF DIFFICULTY. YOU CHOSE THE"
150 PRINT"ONE YOU WISH (1-EASIEST ; 5-HARDEST). IF"
160 PRINT"YOU ANSWER THE QUESTION CORRECTLY, YOU"
170 PRINT"GET TO SHOOT AT FLYING SAUCERS. THE NUM-"
180 PRINT"BER OF SHOTS YOU GET DEPENDS ON WHICH"
190 PRINT"LEVEL OF DIFFICULTY IS CHOSEN. LEVEL 1"
200 PRINT"ALLOWS YOU ONE SHOT, LEVEL 2, TWO SHOTS,"
210 PRINT"ETC. THE FIRST PLAYER TO SCORE TEN HITS"
220 PRINT"IS THE WINNER. TO SHOOT AT THE SAUCERS,"
230 PRINT"PRESS THE SPACE BAR. YOU GET A MAXIMUM"
240 PRINT"OF ONE SHOT AT EACH SAUCER. GOOD LUCK!"
260 PRINT"  PRESS THE  SPACE BAR  TO START.";
270 FOR PAUSE=1TO1000:NEXTPAUSE
280 GETKEY$:IFKEY$(">") THEN290
299 REM: *** INPUT NAME OF PLAYERS ***
300 PRINT"  "
310 FORLOOP=1TO2:NAME$(LOOP)=""
```



```

320 PRINT "ENTER THE NAME OF #"; LOOP; "PLAYER  -[ ]";
330 INPUT NAME$(LOOP)
340 NAME$(LOOP)=LEFT$(NAME$(LOOP),8): IF LEN(NAME$(LOOP))=8 THEN 360
350 NAME$(LOOP)=NAME$(LOOP)+MID$( "           ",1,8-LEN(NAME$(LOOP)))
360 NEXT LOOP
399 REM: *** START OF MAIN LOOP ***
410 TURN=TURN+1: ANSWER=0: PROPER=0
420 IF TURN>2 THEN TURN=1
430 PRINT "*****"
440 PRINT "  TURN  "
450 PRINT " "; TAB(SPACE(TURN)); TURN$(TURN)
460 PRINT " "; NAME$(1); " "; NAME$(2); " "
470 PRINT " " "NUMBER(1)" " "NUMBER(2)" "
499 REM: *** PERCENTAGE PROBLEMS ***
500 INPUT "CHOOSE A LEVEL OF DIFFICULTY (1-5)  [ ]"; LEVEL
510 LEVEL=INT(LEVEL): IF LEVEL<1 OR LEVEL>5 THEN PRINT " "; :GOTO500
520 ON LEVEL GOTO 530,550,570,590,610
530 PERCENTAGE=10*(INT(RND(1)*10)+1)
540 NUMBER=10*(INT(RND(1)*8)+1):GOTO630
550 PERCENTAGE=10*(INT(RND(1)*10)+1)
560 NUMBER=5*(INT(RND(1)*18+1)):GOTO630
570 PERCENTAGE=5*(INT(RND(1)*18+1))
580 NUMBER=5*(INT(RND(1)*18+1)):GOTO630
590 PERCENTAGE=5*(INT(RND(1)*18+1))
600 NUMBER=INT(RND(1)*99+1):GOTO630
610 PERCENTAGE=INT(RND(1)*99+1)
620 NUMBER=INT(RND(1)*99+1)
630 PROPER=NUMBER*PERCENTAGE/100: ANSWER=0
640 PRINT "WHAT IS ";STR$(PERCENTAGE); "% OF ";NUMBER; "  [ ]";
650 INPUT ANSWER
659 REM: *** IS THE ANSWER CORRECT ? ***
660 IF ANSWER>PROPER-.001 AND ANSWER<PROPER+.001 THEN 700
670 PRINT "SORRY, BUT YOU ARE  [ ]WRONG [ ]"
680 PRINT "THE CORRECT ANSWER IS";PROPER; "."
690 FOR PAUSE=1 TO 1000: NEXT PAUSE:GOTO410
700 PRINT "CONGRATULATIONS. YOU ARE  [ ]CORRECT [ ]"
710 FOR PAUSE=1 TO 1000: NEXT PAUSE
720 PRINT "  "
723 PRINT "  "
725 PRINT "  "
730 PRINT "  "
900 REM: *** SAUCER GAME ***
909 REM: *** GENERATE THE SAUCER ***
920 PRINT "*****"
930 IF TURN=1 THEN 950
940 PRINT TAB(29) "[ ] [ ] [ ]":GOTO960
950 PRINT TAB(9) "[ ] [ ] [ ] [ ] [ ]"
960 SHOT=0
970 MAXIMUM=LEVEL
980 HEIGHT=6+INT(RND(1)*8): IF RND(1)<.5 THEN 1000
990 WIDTH=1:WAY=1:GOTO1100
1000 WIDTH=V2:WAY=-1
1049 REM: *** MOVING THE SAUCER ***
1050 FOR PAUSE=1 TO 30: NEXT PAUSE
1100 PRINT LEFT$(H$,HEIGHT+1); TAB(WIDTH); S$
1110 WIDTH=WIDTH+WAY
1120 IF WIDTH>0 AND WIDTH<=V2 THEN 1200
1130 PRINT LEFT$(H$,HEIGHT+1); TAB(WIDTH); " ":GOTO930
1199 REM: *** FIRING AND MOVING THE SHOT ***

```



```

1200 GETKEY$: IFSHOT=0ANDKEY$<>" THEN1050
1210 IFSHOT>0THEN1340
1249 REM: *** THE SHOT HAS JUST BEEN FIRED ***
1250 SHOT=1:HIGHT=18
1260 WOTH=20+((TURN*2-3)*10)
1340 POKEV6+HIGHT*V3+WOTH,V1
1350 HIGHT=HIGHT-1:WOTH=WOTH-(TURN*2-3)
1360 IFHIGHT>3THEN1400
1370 SHOT=0:PRINTLEFT$(H$,HEIGHT+1);TAB(WIDTH);"
1385 MAXIMUM=MAXIMUM-1:IF INT(MAXIMUM)>0 THEN 980
1390 PRINT"SaucerSORRY, BUT YOU RAN OUT OF SHOTS."
1393 FOR PAUSE=1TO1000:NEXTPAUSE
1396 PRINT"□"
1398 GOTO410
1399 REM: *** HAS A SHOT HIT THE SAUCER ***
1400 IFPEEK(V6+HIGHT*V3+WOTH)<>V1THEN1450
1410 POKEV6+HIGHT*V3+WOTH,81:GOTO1100
1449 REM: *** THE SHOT HAS HIT THE SAUCER ***
1450 POKEV6+HIGHT*V3+WOTH,81:POKEV6+HIGHT*V3+WOTH-1,64
1460 POKEV6+HIGHT*V3+WOTH+1,64:POKEV6+HIGHT*V3+WOTH-81,77
1470 POKEV6+HIGHT*V3+WOTH-80,93:POKEV6+HIGHT*V3+WOTH-79,78
1480 POKEV6+HIGHT*V3+WOTH+79,78:POKEV6+HIGHT*V3+WOTH+80,93
1490 POKEV6+HIGHT*V3+WOTH+81,77:FOR PAUSE=1 TO 100:NEXT PAUSE
1492 POKEV6+HIGHT*V3+WOTH,V1:POKEV6+HIGHT*V3+WOTH-1,V1
1494 POKEV6+HIGHT*V3+WOTH+1,V1:POKEV6+HIGHT*V3+WOTH-81,V1
1496 POKEV6+HIGHT*V3+WOTH-80,V1:POKEV6+HIGHT*V3+WOTH-79,V1
1498 POKEV6+HIGHT*V3+WOTH+79,V1:POKEV6+HIGHT*V3+WOTH+80,V1
1500 POKEV6+HIGHT*V3+WOTH+81,V1
1509 REM: *** IS THE GAME OVER?
1510 NUMBER(TURN)=NUMBER(TURN)+1
1515 IF NUMBER(TURN)>=10 THEN1520
1516 SHOT=0:MAXIMUM=MAXIMUM-1:IF INT(MAXIMUM)>0 THEN 980
1518 GOTO410
1520 PRINT"Q THE GAME IS OVER. ";NAME$(TURN);"HAS WON."
1530 INPUT"QDO YOU WANT TO PLAY AGAIN?Y/N) YQ":T$
1540 IF T$="N" THEN PRINT"Q":END
1550 IF T$<>"Y" THEN PRINT"Q":GOTO 1530
1560 GOTO 20

```

"Saucer Shootout" PET Version:

The following lines have to be changed or added to the CBM/SuperPET listing of Saucer Shootout:

```

60 V1=32:V2=37:V3=40:V4=252:V5=254:V6=32767

1460 POKEV6+HIGHT*V3+WOTH+1,64:POKEV6+HIGHT*V3+WOTH-41,77
1470 POKEV6+HIGHT*V3+WOTH-40,93:POKEV6+HIGHT*V3+WOTH-39,78
1480 POKEV6+HIGHT*V3+WOTH+39,78:POKEV6+HIGHT*V3+WOTH+40,93
1490 POKEV6+HIGHT*V3+WOTH+41,77:FOR PAUSE=1 TO 100:NEXT PAUSE
1492 POKEV6+HIGHT*V3+WOTH,V1:POKEV6+HIGHT*V3+WOTH-1,V1
1494 POKEV6+HIGHT*V3+WOTH+1,V1:POKEV6+HIGHT*V3+WOTH-41,V1
1496 POKEV6+HIGHT*V3+WOTH-40,V1:POKEV6+HIGHT*V3+WOTH-39,V1
1498 POKEV6+HIGHT*V3+WOTH+39,V1:POKEV6+HIGHT*V3+WOTH+40,V1
1500 POKEV6+HIGHT*V3+WOTH+41,V1

```

Line 10 is not needed and therefore it should be deleted.

Bomber Drop

In this arcade style game, you are the Mayor of a small community on the planet IM. The planet of IM is a very picturesque planet with only one major drawback. Every fifty years, a large rainstorm occurs. When the rainstorm develops, the upper stratosphere of IM combines with the deadly uranian gas to form what Imians call "atomic egg fallout". Your job as mayor of the community is to use the "antimatter neutralizer" every time it rains to destroy the falling "nuclear eggs". If you let a nuclear egg hit the ground, your entire community will be instantly vaporized.

To maneuver the antimatter neutralizer, you use the numeric keypad 1,2,3,4,6,7,8,9 (on PET/CBM) or I,J,K,M (on VIC-20).

Here is a listing of the the main variables used in Bomber Drop:

Variables:

SC	current score
HS	high score
SK%	skill level
TI,TT	used with SK% to determine time interval between b
ST%()	current status of each falling egg
H%(),W%()	current coordinates of each falling egg
M\$,N\$,O\$	used to print and erase the antimatter neutralizer
BE%,BA%	current coordinates of the antimatter neutralizer
KEY, H%(),W()	movement of the antimatter neutralizer
OH%,OW%	old coordinates of the antimatter neutralizer
TS,B3	distances between each falling nuclear egg.

VIC-20 Version

```

10 DIMSTX(5),HX(5),WX(5),H(32),W(32)
20 POKE36879,125
25 PRINT"      BOMBER DROP":INPUT"SKILL LEVEL (1-9)  ";SK%
30 IFSK%<1ORSK%>9THEN25
35 M$="":N$="":O$="":BE=5:BA=21
40 SK%=SK%+1:BE%=5:BA%=21
45 H(0)=-1:W(0)=0:H(24)=1:W(24)=0:H(8)=0:W(8)=-1:H(32)=0:W(32)=1
50 FORN=1TO5:STX(N)=1:NEXTN:SC=0:B3=15
60 PRINT"      BOMBER DROP"
70 PRINT"SC=";SC;TAB(9);"HI  SC=";HS
73 FORX=1TO20:PRINT"                                ":NEXTX
75 PRINT"-----";
80 PRINTLEFT$(M$,BA%+1);TAB(BE%);N$;
99 REM: MOVE YOUR BASE
100 B3=B3-.01:N=N+1:IFN>5THENN=1
105 IFSX(N)>1THEN150
110 TS=TS+1:IFRND(1)>.2THEN300
120 IFTS<B3THEN300
130 TS=0:STX(N)=2:WX(N)=INT(RND(1)*18+2):HX(N)=2
150 OHX=HX(N):HX(N)=HX(N)+1
170 POKE7679+WX(N)+OHX*22,32
190 IFPEEK(7679+WX(N)+HX(N)*22)=160THENSTX(N)=1:GOTO600
200 IFHX(N)>21THEN210
205 POKE7679+WX(N)+HX(N)*22,81:GOTO300
210 POKE7679+WX(N)+HX(N)*22,46:FORPAUSE=1TO60:NEXTPAUSE
220 POKE7679+WX(N)+HX(N)*22,81:FORPAUSE=1TO80:NEXTPAUSE
230 POKE7679+WX(N)+HX(N)*22,102:FORPAUSE=1TO80:NEXTPAUSE
235 GOSUB2000
240 PRINT"YOUR COMMUNITY HAS":PRINT"BEEN VAPORIZED."
245 FOR PAUSE=1TO1000:NEXT PAUSE
250 FORX=1TO30:GETT$:NEXTX
260 IFSO>HSTHENHS=SC

```



```

270 PRINT"DO YOU WANT ANOTHER":PRINT"GAME (Y/N) ?"
275 GETA$:IFA$=""THEN275
280 PRINTA$:IFA$="Y"THENPRINT"":GOTO25
290 IFA$<"N"THEN275
300 PRINT"HIGH SCORE=";HS:END
600 POKE7657+HX(N)*22+WZ(N),66:POKE7657+HX(N)*22+WZ(N)+1,76
610 POKE7657+HX(N)*22+WZ(N)-1,77
620 POKE7657+HX(N)*22+WZ(N),32:POKE7657+HX(N)*22+WZ(N)+1,32
630 POKE7657+HX(N)*22+WZ(N)-1,32:SC=SC+10:PRINT"SCORE=";SC
800 IFTI>TT+3KXTHENGOSUB1100
900 GOTO100
1100 KEY=PEEK(197):OHX=BAZ:OWZ=BEZ:IFKEY<12ORKEY>44THENRETURN
1110 BEZ=BEZ+W(KEY-12):BAZ=BAZ+H(KEY-12)
1115 IFBEZ<1ORBEZ>13THENBEZ=OWZ
1120 IFBAZ<6ORBAZ>21THENBAZ=OHX
1130 PRINTLEFT$(M$,BAZ+1);TAB(BEZ);N$;
1135 IFOHX<BAZTHENPRINTLEFT$(M$,OHX+1);TAB(BEZ-1);O$;
1140 POKE7679+BAZ*22+BEZ,32:POKE7679+BAZ*22+7+BEZ,32:TT=TI:RETURN
2000 PRINT"XXXXXXXXXXXXXXXXXXXXX";
2010 E$="TT"
2020 PRINT"X"
FORX=1TO21:PRINTE$:NEXTX:RETURN

```

CBM/SuperPET Version

```

10 DIMSTX(5),HX(5),WZ(5)
20 PRINT CHR$(142):REM : THIS LINE CONVERTS CBM 8032 SCREEN.
25 PRINT" BOMBER DROP":INPUT"SKILL LEVEL (1-10) ";S KX
30 IFSKX<1ORSKX>10THEN25
35 M$=" ";N$=" ";O$=" "
40 SKX=SKX+1:BEZ=15:BAZ=23
45 RESTORE:FORX=1TO9:READH(X),WZ(X):NEXTX
50 FORN=1TO5:STX(N)=1:NEXTN:SC=0:B3=15
60 PRINT" BOMBER DROP"
70 PRINT"SCORE=";SC:TAB(20);"HIGH SCORE=";HS
75 PRINT"XXXXXXXXXXXXXXXXXXXXX";
80 PRINTLEFT$(M$,BAZ+1);TAB(BEZ);N$;
90 REM: MOVE YOUR BASE
100 B3=B3-.01:N=N+1:IFN>5THENN=1
105 IFSTX(N)>1THEN150
110 TS=TS+1:IFRND(1)>.2THEN800
120 IFTS<B3THEN800
130 TS=0:STX(N)=2:WZ(N)=INT(RND(1)*37+2):HX(N)=2
150 OHX=HX(N):HX(N)=HX(N)+1
170 POKE32767+WZ(N)+OHX*80,32
190 IFFEEK(32767+WZ(N)+HX(N)*80)=160THENSTX(N)=1:GOTO600
200 IFHX(N)>23THEN210
205 POKE32767+WZ(N)+HX(N)*80,81:GOTO800
210 POKE32767+WZ(N)+HX(N)*80,46:FORPAUSE=1TO80:NEXTPAUSE
220 POKE32767+WZ(N)+HX(N)*80,81:FORPAUSE=1TO80:NEXTPAUSE
230 POKE32767+WZ(N)+HX(N)*80,102:FORPAUSE=1TO80:NEXTPAUSE

```



```

235 GOSUB2000
240 PRINT"*****YOUR COMMUNITY HAS BEEN VAPORIZED.":FORPAUSE=1TO1000:NEXTPAUSE
250 FORX=1TO30:GETT$:NEXTX
260 IFSC>HSTHENHS=SC
270 PRINT"*****DO YOU WANT ANOTHER GAME (Y/N) ?":
275 GETA$: IFA$="" THEN275
280 PRINTA$: IFA$="Y" THENPRINT"":GOTO25
290 IFA$<"N" THEN275
300 PRINT"*****HIGH SCORE=":HS:END
600 POKE32687+H%(N)*80+W%(N),66:POKE32687+H%(N)*80+W%(N)+1,78
610 POKE32687+H%(N)*80+W%(N)-1,77
620 POKE32687+H%(N)*80+W%(N),32:POKE32687+H%(N)*80+W%(N)+1,32
630 POKE32687+H%(N)*80+W%(N)-1,32:SC=SC+10:PRINT"*****SCORE=":SC
800 IFTI>TT+SK% THENGOSUB1100
900 GOTO100
1100 KEY=PEEK(151):OH%=BA%:OW%=BE%:IFKEY<177ORKEY>185 THENRETURN
1110 BE%=BE%+W(KEY-176):BA%=BA%+H(KEY-176)
1115 IFBE%<10RBE%>32 THENBE%=OW%
1120 IFA%<10RBA%>23 THENBA%=OH%
1130 PRINTLEFT$(M$,BA%+1):TAB(BE%):N$;
1135 IFOH%>BA% THENPRINTLEFT$(M$,OH%+1):TAB(BE%-1):O$;
1140 POKE32767+BA%*80+BE%,32:POKE32767+BA%*80+7+BE%,32:TT=TI:RETURN
2000 PRINT"*****";
2010 E$="000"
2020 PRINTRIGHT$(E$,40):FORX=1TO24:PRINT E$:NEXTX:RETURN
3000 DATA1,-1,1,0,1,1,0,-1,0,0,0,1,-1,-1,-1,0,-1,1

```

"Bomber Drop" PET Version:

The following lines have to be changed or added to the CBM/SuperPET listing of Bomber Drop:

```

10 DIMST%(5),H%(5),W%(5),W(32),H(32)
45 H(0)=1:W(0)=0:H(32)=-1:W(32)=0:H(23)=0:W(23)=1:H(24)=0:W(24)=-1
130 TS=0:ST%(N)=2:W%(N)=INT(RND(1)*36+2):H%(N)=2
170 POKE32767+W%(N)+OH%*40,32
190 IFPEEK(32767+W%(N)+H%(N)*40)=160 THENST%(N)=1:GOTO600
205 POKE32767+W%(N)+H%(N)*40,81:GOTO800
210 POKE32767+W%(N)+H%(N)*40,46:FORPAUSE=1TO80:NEXTPAUSE
220 POKE32767+W%(N)+H%(N)*40,81:FORPAUSE=1TO80:NEXTPAUSE
230 POKE32767+W%(N)+H%(N)*40,102:FORPAUSE=1TO80:NEXTPAUSE
260 IFSC>HSTHENHS=SC
600 POKE32727+H%(N)*40+W%(N),66:POKE32727+H%(N)*40+W%(N)+1,78
610 POKE32727+H%(N)*40+W%(N)-1,77
620 POKE32727+H%(N)*40+W%(N),32:POKE32727+H%(N)*40+W%(N)+1,32
1100 KEY=PEEK(515):OH%=BA%:OW%=BE%:IFKEY<18ORKEY>50 THENRETURN
1110 BE%=BE%+W(KEY-18):BA%=BA%+H(KEY-18)
1115 IFBE%<10RBE%>31 THENBE%=OW%
1140 POKE32767+BA%*40+BE%,32:POKE32767+BA%*40+7+BE%,32:TT=TI:RETURN

```

Line 20 and line 3000 are not needed so therefore they should be deleted. In line 630, the first part of it must be changed to read: POKE 32727 + H%(N) × 40 + W%(N) - 1,32. The rest of the line 630 should be typed in as it is listed in the CBM/SuperPET version of Bomber Drop.

Artillery

Artillery is the first of a new series of programs designed to use the VIC-20's sound, colour, and graphic capabilities to their fullest. (Unfortunately, Artillery cannot be converted to run on other Commodore computers.)

Artillery is a two-player trajectory game for the VIC-20 computer with the Super Expander cartridge and is totally in high resolution graphics. The object of this game is to knock out your opponent's mortar which is situated on the opposite side of a wall.

Each player is in charge of a mortar and must choose the charge strength and the angle of his gun while considering wind direction, speed of wind, and overall distance between the two mortars. The maximum allowable mortar angle is 100° (considering that 90° is straight up). Wind speed varies between 0 and 30 mph in either direction. The distance between the two opponents mortar varies from between 200 and 350 miles.

Players are alternately prompted for firing data; wrong entries can be changed by pressing the "delete" key before the "return" key is pressed. The computer decides at the the beginning of the game who goes first. The first player who scores 5 hits on his opponent's mortar wins.

To make the game a little bit more challenging and difficult, you can adjust the wind speed variations by editing the random number generator in line 400. Hit sensitivity can be adjusted in lines 315 and 317. You can make the game end after more or less than 5 turns by changing line 851. To see the peculiar effects of a stronger or a weaker gravity, change the value of GR in line 300.

The following is a list of important subroutines and variables:

Subroutines:

Line Number	Function
0-99	Initialize Game
100	Change sides
200	Plot Loop-test for hit
300	Test Hit-wall, border, or opponent
400	Draw screen
500	Get input
600	Erase plot
700	Crash
800	Opponent Hit
900	Game Over
950	Introduction

Variables:

W	wind Speed
FO	charge
AN	angle
SI%	side that starts
LR	current side shooting
MA	position of mortar
DX	horiz. position of mortar
DY	vert. position of mortar
T	counter(time component of mortar)
GR	gravity constant
PX	position of last dot(horiz.)
PY	position of last dot(vert.)
PL	random component of cannon position
X	vert. change in dot position
Y	horiz. change in dot position
Y1	blast orgin(vert.)
Y2	blast orgin(horiz.)
LS	left player score
RS	right player score

VIC-20 Version

```

5 GOSUB350:GOSUB950:CLR:GOSUB350
25 SIX=INT(RND(1)*2)+1:ONSIXGOTO26,28
26 LR=-1:GOTO40
28 LR=1
40 GRAPHIC2:COLOR3,6,1,2:GOSUB400:M1=(8.3-PL)*51:M2=(11.8+PL)*51
100 LR=-LR:IFLR=-1THENM1=M2
120 IFLR=1THENM1=M1
140 GOSUB500
200 X=COS(AN)*FO*LR:Y=SIN(AN)*FO:T=0:N=0:DX=MA:POKEY,10:TN=190
245 T=T+IN:POKE$1,TN:X=X+(W-X)/80:DX=DX+X:DY=833-(Y*T-GR*T/2)
260 N=N+1:IFABS(PX-DX)<13ANDABS(PY-DY)<13THEN245
262 IFDX<0ORDX>1023ORDY<0ORDY>1023THENG=9:GOTO300
265 IFRDOT(DX,DY)<>3THEN300
270 TN=TN-1:POINT2,DX,DY:PX=DX:PY=DY:GOTO245
300 POKE$1,0:ONLR+2GOTO317,1,315
315 IFDX>(13.1+PL)*51ANDDX<(14.4+PL)*51ANDDY>830THEN800
316 GOTO318
317 IFDX>(5.8-PL)*51ANDDX<(7.1-PL)*51ANDDY>830THEN800
318 IFC=9THEN300
320 GOSUB700
330 GOSUB600:GOTO100
350 GR=.07:IN=4:SI=36876:S2=36877:V=36878:SH=36879:RETURN
390 GOTO100
400 GOSUB960:W=INT(RND(1)*60)-30
420 DRAW1,65,1023TO55,950TO490,950TO490,580TO534,580TO534,950TO958,950TO958,1023
432 PAINT2,512,800:FORBR=624TO948STEP46:DRAW0,490,BRT0534,BR:NEXT:PL=INT(RND(1)*
3)+1
460 CHAR18,6-PL,"#":CHAR17,7-PL,"/":CHAR18,13+PL,"#":CHAR17,12+PL,"\"
480 CHAR0,8,STR$(ABS(W)):IFW=0THEN490
486 IFW<0THEN:CHAR0,6,"<"
488 IFW>0THEN:CHAR0,13,">"
490 RETURN
500 IFLR=1THENA=0:B=0:GOTO508
507 A=16:B=0
508 CHARB+1,A," "
510 E$="C":GOSUB512:FO=F/6:GOTO565
512 CHARB,A+1," ":F1$="":F2$="":F3$=""
520 CHARB,A," ":GETF$:CHARB,A,E$:GOSUB595:IFF$=""THEN520
525 CHARB,A+1,F$:F1$=F$:F$=""
530 GETF$:IFF$=""THEN530
532 IFF$=CHR$(20)THEN512
535 IFF$=CHR$(13)THENF=VAL(F1$):RETURN
536 GOSUB595:IFF$=""THEN530
538 CHARB,A+2,F$:F2$=F$:F$=""
540 GETF$:IFF$=""THEN540

```



```

542 IFF#=CHR$(20)THEN512
545 IFF#=CHR$(13)THENF=VAL(F1#+F2#):RETURN
547 GOSUB595:IFF#=""THEN548
549 CHARB,A+3,F#:F3#=F#:F#=""
550 GETF#:IFF#=""THEN550
554 IFF#=CHR$(20)THEN512
556 IFF#<>CHR$(13)THEN550
557 F=VAL(F1#+F2#+F3#)
560 RETURN
565 B=1:E#="A"
570 GOSUB512:IFF>100THEN570
571 AN=F/100*PI:AN=AN*(SIN(AN)*1.5)
590 RETURN
595 IFF#=""THEN599
597 IFASC(F#)<48ORASC(F#)>57THENF#=""
599 RETURN
600 POKE$1,0:T=0:FORG=1TO200:NEXT:X=COS(AN)*F0*LR:DX=MA:FORG=1TON-1:T=T+IN:X=X+(
W-X)/60
645 DX=DX+X:DY=655-(Y*(T-GR*T)^2)
650 IFABS(PX-DX)<13ANDABS(PY-DY)<13THEN660
655 POINT0,DX,DY:PX=DX:PY=DY
660 NEXT:FORG=1TO999:NEXT:RETURN
700 X1=DX-X:Y1=655-(Y*(T-IN/2)-GR*(T-IN/2)^2):V0=15:POKE$2,220
710 FORL=Y1-25TOY1+15STEP4:V0=V0-1.3:POKEV,V0
715 RAX=INT(RND(1)*15)+2:FORG=X1-RAX*TOX1+RAX:IFL<0THENL=0
730 POINT0,0,L:NEXT:NEXT:POKE$2,0:RETURN
800 POKE$6865,15:FORG=1TO50:NEXT:POKE$6865,28:COLOR2,2,2,2:FORG=1TO99:NEXT:COLOR
0,3,1,1
820 GOSUB700:COLOR3,6,1,1:IFLR>0THENL3=L3+1
950 IFLR<0THENR3=R3+1
951 IFL3>40RR3>4THEN920
955 GOSUB960:GOTO870
960 CHAR19,0,RIGHT$(STR$(L3),1):CHAR19,19,RIGHT$(STR$(R3),1):RETURN
970 GOSUB600:SCNCLR:GOSUB660
980 GOTO25
990 GRAPHIC4:POKESH,76:PRINT"#####":IFL3>R3THENPRINT"LEFT":GOTO910
995 PRINT"RIGHT":
910 PRINT"PLAYER WINS!":PRINT"#####ANOTHER GAME?#####"
920 GETY#:IFY#=""THEN920
930 IFY#="Y"THENRUN
940 END
950 POKESH,12:PRINT"#####WELCOME TO...":FORG=1TO800:NEXT:POKEV,15:Z=7.1
955 POKESH,12:PRINT"#####WELCOME TO...":FORG=1TO800:NEXT:POKEV,15:Z=7.1
960 FORG=1TO9:POKE$2,220:READL(G),P(G):Z=Z+.9:POKESH,Z
970 POKE7862+P(G),L(G):FORY=1TO70:NEXT:POKE$2,0:FORR=1TO30:NEXT:NEXT
975 PRINT"#####Y...#####PHIL VIRUD #####COLIN MURRAY":FORR=1TO2
000:NEXT
977 PRINT"#####ENTER CHARGE AND#####ANGLE WHEN":PRINT"#####PROMPTED"
978 PRINT"#####WATCH THE WIND!":FORG=1TO200:POKE7616,1:POKE7777,3:POKE7618,32
980 POKE7777,32:NEXT:POKESH,217:RETURN
985 DATA12,5,18,6,13,2,3,4,23,9,5,7,20,3,1,1,12,6

```


Airport Tower

You are an air-traffic-controller and your job is to ensure that all airplanes entering your district go to their desired destinations. This game will work only on 40-column PET/CBM/SuperPET computers. (This program will work on CBM/SuperPET computers only if the screen has been converted to 40-columns). Each time a new plane enters your district, information on it will be posted briefly at the bottom of the screen in reverse characters. Airplane turns will be made in increments of 45° each turn of play. Altitude can be increased or decreased by one unit each turn. If you want an aircraft to have an increase in altitude of five, then specify an altitude five higher than what it currently has. Watch the altitudes carefully; if two planes are at the same altitude and on the same space, then the two planes will collide. When leaving the screen, airplanes need an altitude of at least five or else your turn will end prematurely. When an airplane lands at either of the two airports (* or #), an altitude of zero is needed to land. To obtain information on any plane, just press the letter of the plane.

The one line of information about an airplane contains the following:

- the name of the airplane.
- after the name of the plane, either a "J" or a "P". This is to signify whether the plane is a jet or a prop. A jet moves much quicker than a prop.
- current direction of the plane.
- current altitude of the plane.
- desired destination.
- last item on the plane information is the fuel supply remaining. If it says "(NP)", then the fuel supply is "no problem". When a number replaces the "(NP)", then you must quickly send the plane to its destination before it runs out of fuel and crashes.

When you have the information displayed for a certain airplane, you can give one of two types of orders. By pressing the "A" key, you can change the airplane's altitude to whichever number you want (1 to 9). By pressing the "L" (left turn) or "R" (right turn) keys, you can change the airplane's direction. (A "1" changes the direction by 45°, a "2" changes the direction by 90°, etc.). After glancing at the information about an airplane, if you do not want to give that airplane any new orders, then just press the RETURN key. This will enable you to give orders to other airplanes. At the beginning of the game, you can choose the number of airplanes that you want to direct and the time limit for your shift as air-traffic-controller.

CBM/SuperPET Version

PET Version

```

10 DIMP(24,8),B$(11),D$(7),C(24,1):PRINT"TIME ?? (40-99) PLANES ?? (10-25) "
15 FORA=0TO299:PRINT": ":NEXT:FORC=0TO11:READA,A,A,A:NEXT:FORA=0TO11:READB$(A)
:NEXT
16 FORA=0TO7:READD$(A):NEXT
20 A=6:GOSUB90:T=VAL(A$)*10:A=7:GOSUB90:T=T+VAL(A$):IFT<40THEN20
30 A=24:GOSUB90:C=VAL(A$)*10:A=25:GOSUB90:C=C+VAL(A$):IFC<100RC>25THEN30
35 F=C/OT=(T-25)/P:FORA=0TOP-1
40 B=INT(RND(1)*P):FORC=0TOA-1:IFP(C,0)<>BTHENNEXT:P(A,0)=B:GOTO50
45 B=B+1:IFB>P-1THENB=0
48 A=A+1:NEXTA
50 P(A,5)=INT(RND(1)*12):P(A,6)=-1:P(A,1)=0:IFRND(1)>.5THENP(A,1)=1
55 RESTORE:B=INT(RND(1)*12):P(A,4)=B:FORC=0TOB:READX,Y,Z:D:NEXT
60 P(A,2)=Z:IFZ=0THENP(A,2)=5+INT(RND(1)*5)
65 P(A,3)=0:P(A,7)=INT(X/2):P(A,8)=Y:NEXTA:X=0:Y=0:Z=0:D=0
68 FORA=0TO24:C(A,0)=P(A,2):C(A,1)=P(A,3):NEXT:GOTO720
70 DATA0,0,0,3,12,0,0,4,26,0,0,4,38,0,0,5,38,7,0,6,38,14,0,7,26,14,0,0
75 DATA12,14,0,0,0,14,0,1,0,7,0,2,10,8,-1,1,22,6,-1,5
76 DATA0,1,2,3,4,5,6,7,8,9,*,#,N,NE,E,SE,S,SW,W,NW
80 PRINT"TAB(A)"TAB(A)"37":FORB=0TO24:GETA$:IFVAL(A$)<>0ORA$="0"THEN93
91 NEXT:PRINT"TAB(A)"?:FORB=0TO24:GETA$:IFA$="0"ORVAL(A$)<>0THEN93
92 NEXT:GOTO90
93 PRINT"TAB(A)A$:RETURN
  
```



```

500 IFP(PL,6)<15ANDP(PL,8)>=0ANDP(PL,7)>=0ANDP(PL,7)<20THEN640
610 RESTORE:FORA=0TOP(PL,5):READB,C,Z,Z:NEXT:IFB<>X*20RC<>YTHEN990
620 IFP(PL,2)>4THENP(PL,6)=-2:PG=PG+1:OS=OS-1:GOTO100
630 PRINT"503ALTITUDE";:GOTO1000
640 IFP(PL,6)=0THENPRINT"503FUEL";:GOTO1000
650 FORA=0TOP-1:IFP(A,6)<0ORP(A,2)<>P(PL,2)ORP(PL,2)<0ORA=PLTHEN680
660 IFX+2>P(A,7)ANDX-2<P(A,7)ANDY+2>P(A,8)ANDY-2<P(A,8)THEN980
680 NEXT:IFP(PL,2)<0THEN100
685 POKE32808+P(PL,7)*2+P(PL,8)*40,P(PL,0)+1
690 POKE32809+P(PL,7)*2+P(PL,8)*40,ASC(B$(P(PL,2))):GOTO100
700 IFP(PL,6)=-20RLP=1THEN100
705 IFPL<>0THENIFP(PL-1,6)=-1THEN100
710 IF(T-25-(P-PG-OS)*OT)>RND(1)*8THEN100
720 P(PL,6)=25+INT(RND(1)*20):IFP(PL,5)<10THENP(PL,6)=P(PL,6)+25
730 PRINT"504PLANE ";CHR$(P(PL,0)+65);" FROM ";
740 OS=OS+1:LP=1:PRINTB$(P(PL,4));" AT ALT. ";:IFP(PL,2)<0THENPRINT"G ";:GOTO1
00
750 PRINTB$(P(PL,2));" ";:GOTO100
860 IFPL+1>24THEN999
931 IFLP=1ANDP(PL+1,6)=-1THEN680
992 IFA+1<25THENIFLP=1ANDP(A+1,6)=-1THEN680
993 PRINT"505COLLISION";:GOTO1000
999 PRINT"505OBJECTIVE";
1000 POKE32808+P(PL,7)*2+P(PL,8)*40,0:POKE32809+P(PL,7)*2+P(PL,8)*40,0
1010 PRINT" ERROR"
1020 PRINT"506 YOUR SHIFT IS OVER. AGAIN (Y/N) ? "
1030 GETA$:IFA$="Y"THENRUN
1040 IFA$<>"N"THEN1030
1050 PRINT"507":END

```


A Look At the New Commodore 64

In today's ever increasing computer industry it can be a very difficult decision choosing your new computer, mainly for fear of obsolescence. The fact is though, that all computers will eventually become obsolete, so waiting for a better one to appear is perpetual. The decisions that have to be made are:

- what you want from your new computer.
- how much money you are willing to pay.
- what specific area will you use your computer most in.

When you have made these decisions you should seriously consider the new Commodore 64 microcomputer. The Commodore 64 looks very much like the VIC-20 on the outside, but it's under the casing of the 64 where things start happening.

The Commodore-64 has a huge 64K of RAM, meaning it can handle approx. 64,000 bits of information which is programmed into the computer every time you use a different program. It can accept a Z80 micro-processor or a plug in cartridge, and has many levels of high resolution graphics. This is a very sophisticated computer that can even handle small business applications. With the help of a cassette interface, you can use most basic programs written for a 40 column PET, without modification, with the exception of programs with PEEK and POKE commands. To eliminate this problem, available is the PET emulator that will get rid of all basic conversions and will allow the Commodore 64 to act like a PET. Through a serial port, the Commodore 64 can use VIC peripherals such as the VIC single disk drive and VIC Graphic printer. With the addition of an IEEE-48 cartridge, the 64 will be able to use any Commodore peripheral available.

Graphics and Colour

The 64's text display consists of 40 columns by 25 lines, with up to 255 different possible background/foreground colour combinations. It has 16 text colours and all of the 64 PET graphic characters. If required, the programmer can create additional characters to replace the normal set. The high resolution graphics are 320 by 200 pixels. For game graphics and animation, 256 independently moveable objects can be created with up to 8 objects per line, with each being 21 by 24 pixels consisting of up to 3 colours each. The 64 also has collision detection between objects, so it can tell if one object hits another, or if one object has moved behind or ahead of another object.

Sound

The Commodore 64 has magnificent sound capabilities, which if hooked up to a good audio system, rivals many of the expensive synthesizers on the market today. The heart of the sound system is the new SID chip (sound interface device). The SID chip isn't just any old chip, it is an actual synthesizer. This IC can produce three independent voices, each capable of a range of nine octaves. Another one of the exciting features of the SID chip is the programmable A.D.S.R. (attack, decay, sustain, and release) feature. The "attack" programs how fast a note reaches its peak amplitude, the "decay" works in reverse, the "sustain" is how long the note lasts (up to 24 seconds), and the "release" is how long it takes the note to fade away. To top it all off, it has programmable filters and resonance controls, which help for better processing of sound.

New Products for the 64

Even though the Commodore 64 is relatively new on the computer market, there is, and will be, a great number of peripherals, games, programs, and other new material available for the 64. Commodore has introduced a new "Easy" series of programs available to help people in the business world and the education system. Included in the "Easy" system are EasyCalc, EasyPlot, EasyFinance, EasySchedule, EasyFile, EasyScript, EasyQuiz, and EasyLesson.

EasyCalc has a display of 65 columns by 44 rows, and can grow to the capacity of a disk. It can print out formulas and assumptions, and can answer "what if" type questions.

EasyScript is a unique word processor that has a 40-240 column text width, has interfacing between a dot-matrix as well as letter quality printers. It has functions, and cursor movement within one page and between pages.

EasyPlot can plot full page charts consisting of bar-charts, line graphs, pie charts, and scatter diagrams. All information from the EasyCalc program can be integrated with EasyPlot.

EasyFinance is a business program with such features as buy vs. lease options, loan and payback analysis, future value of annuities due, profit margin, and also future and present values.

EasySchedule is a tool for organizing and planning your time and resources. It can also help keep appointment logs.

EasyFile is a full fledged database for electronic filing.

For teachers there are EasyQuiz, and EasyLesson. These help teachers design and issue tests and quizzes as well as plan their lessons.

Some other business orientated programs are a mailing list, stock control, file managers, and an accounting program. Later on there will be the impressing Simon's Basic as well as the compiler Basic. This is a version of Petspeed Basic compiler. The compiler takes up less memory space and runs programs a lot faster than the average program. This means that you can now put larger programs into a smaller space in the memory.

In Conclusion

The Commodore 64 is a true winner. It has lots of memory, which programmers will find a true delight to work with. The 64 is an excellent games machine, the sound is terrific, and it has many inexpensive peripherals available. The computer is a steal at \$500 U.S. and \$800 Canadian.

The Zipper Mailing List Package

Zipper is a mailing list package with flexible data format and output options, as well as sophisticated selection and sorting capabilities. Yet it is also quick and easy to use, with plain English prompts, error messages, and a special HELP key.

The Zipper provides up to 16 items per label, up to 70 characters per item, and over 2000 labels per disk. When entering data, you can define your own input formats, re-enter the last thing typed in for an item in a single key-stroke, and automatically check for duplicate labels upon input. Output can be obtained to the screen, to the printer, or to a disk file. Sorting and selecting are available on any item or items. Options include printing all labels, every n'th one, or choose based on your own selection criteria. Output formats can be defined up to 8 labels per line.

The Zipper is menu-driven with simple commands and prompts, along with complete error checking and meaningful error messages. This package interfaces with other packages and can output to sequential files so that you can use a word processor to create personalized form letters.

Adding, editing, or deleting labels can be done quickly and easily. The package allows you to merge or split files as well as quick access to any label.

The Zipper package is for CBM/SuperPET computers with an 8050 disk drive. Zipper retails for \$147 (U.S. Funds) and is available from local dealers or direct through INI Inc., 4013 Chestnut Street, Philadelphia, PA 19104.

Book Reviews:

"32 Basic Programs for the PET Computer"

by Tom Rugg & Phil Feldman

If you own a Pet 2001, 4016, or a 4032 computer and you can't wait to do something constructive with it, you should buy this book. It is a useful book which contains 32 documented programs for both beginner programmers and the more advanced programmers. The programs include applications for practical uses at home or work, educational games, graphic displays, mathematical and other miscellaneous programs. The book contains 8 sections of instructions which goes as follows:

1. The purpose of the programs — explanations
2. How to use the programs
3. Sample runs — shows you what you actually should see on the screen
4. The program listings
5. Easy and basic changes for the programs
6. Main routes — explains general logic of programs
7. The definition of the important variables used
8. Suggested projects — provides ideas for major changes to programs (projects mainly for advanced programmers).

This book is designed for people who need to expand their knowledge in BASIC programming. It is rather a simple and straight-forward book which makes it a good choice for beginners. The 32 documented programs will definitely help you in constructing your own programs, since you are actually practicing with simple quality programs that work. "32 BASIC Programs for the PET Computer" — Dilithium Press, 11000 S.W. 11th Street, Beaverton, Oregon 97005, USA.

"Getting Acquainted with Your VIC-20"

by Tim Hartnell

This book will lead you in a step-by-step introduction to programming your VIC-20 computer. It will introduce you to simple functions and commands in the BASIC language, teaching you how to use the music, color, and sound capabilities of your VIC-20. There are over 60 short program listings of games in the book, which include close inspections and explanations of each program. This will certainly widen your knowledge of computer programming. The book is a worthwhile resource and is highly recommended for VIC-20 owners who are beginning to learn about BASIC programming. It is designed simply to help the reader make the most out of his microcomputer. "Getting Acquainted With Your VIC-20" costs \$8.95 and it is available from Creative Computing Press, 39 East Hanover Avenue, Morris Plains, NJ 07940, USA.

Avalon Hill Games Review

This is a review on Galaxy, Voyager 1, and Tanktics games introduced by Avalon Hill for Commodore computers. They all work on the PET 40-column and the CBM 80-column computers, with the exception of Voyager 1 which only works on the CBM/SuperPET. These games are very popular around the office. All the games come on cassette and are not available on disk at this time. We recommend that you master the instructions before playing any of these programs since they are advanced level games. Any one of these games will provide hours of enjoyment for you and your friends. All of these games are available from The Avalon Game Co., 4517 Harford Road, Baltimore, MD 21214.

Galaxy

You are an admiral of a fleet of starships. Your orders are to take and hold the galaxy against your opponents. After the initial formation of the galaxy has been completed by the computer, you have the choice of accepting it or having the computer create another galaxy. The computer needs 4 minutes to set up each new galaxy. You have the choice of how many planets occupy the system, and how long you want the game to last. The objective is to take over and control the galaxy from your opponents. Each player is assigned a fleet of ships which he distributes among the planets in the eventual goal to take them over. After each round of play, the computer processes the wars that have occurred that year. All fleets have a certain firepower and effectiveness. Each planet occupied by a player has a certain production level of ships to replace the ones lost in battle. At the end of the game, the one who occupies the most planets wins.

People who like playing against each other, not just the computer, will enjoy this game. We feel this game, priced at \$20 (U.S. funds), is very good(★★★★)and we recommend you try it.

Tanktics

The setting for this game is on the eastern front during World War II. This game represents the battle for the Dniepeu River where the Soviets were advancing against the German retreat.

Tanktics is a high strategy game and therefore not a fast, loud, or colourful arcade type game.

The game utilizes a board to represent the different types of terrain and markers for the tanks and anti-tank guns.

There are five scenarios you can choose from. In all five scenarios you are the German commander in charge of a small Panzer division and you are outnumbered two to one! Before playing the game, you will be required to enter information pertaining to the set-up of the game into the computer.

The point of all of the scenarios is to occupy the objective hex and hold it against the enemy. The game is won if, when the game expires, you have a positive score in all aspects of battle.

Scenario #1 Meeting Engagment

The computer places you and your tanks somewhere on the map. An objective hex is specified and you must reach and occupy it while destroying as many of the enemy's forces as possible.

Scenario #2 Hedgehog Defence

Your tanks are placed around the objective hex and you must defend it against the advancing Soviet tanks.

Scenario #3 Armored Assault

This is the same as Scenario #2 except the roles are reversed and the Soviets are surrounding the hex.

Scenario #4 Line Defence

In this scenario you place your tanks in a line and the hex is placed behind your line of defence. The Russians try to break through your line and occupy the objective hex.

Scenario #5 Line Assault

This is the same as Scenario #4 except the roles are reversed and you must break through their wall.

This game has one fault that we have noticed. The objective hex is occasionally placed someplace that is not on the map. This is easily overcome by restarting the game until the hex appears in its proper place. Usually the game must be restarted only once. True strategists may not like this game because it does not take into account such things as machinery breakdown, fatigue, morale, and exposure. Tanktics costs \$24 (U.S. funds), and we (★★★★) highly recommend this game for the intermediate strategist.

Voyager 1

In Voyager 1, a robot ship programmed by higher beings is heading toward Earth to destroy it and take slaves. You have infiltrated the ship and your mission is to stop it from reaching Earth. The programmers have chosen to send robots after you, who shoot first and ask questions later.

The game can be won in one of two ways. You can capture the ship, or you can destroy it. To accomplish either of these you must wander around the ship killing robots as you go. If you decide to cripple, or destroy the ship, you must destroy all generators on all four levels. Once you do this, you have less than one minute to escape the ship in one of the shuttles. You maneuver around the ship using the cursor control keys. It takes quite a bit of practice to get used to orienting your man as per the ship's map. This game is exceptionally responsive for BASIC programming. Every game you play has a different set-up and you can never be sure of what will be where. A maneuver we found very useful when we died is to enter the "continue" command into the computer, and keep playing the same game. Voyager 1 is priced at \$20 (U.S. funds). We feel this game is very good(★★★★).

Double K-Byters: A Programming Challenge

Strictly Commodore is inviting its readers to submit "Double K-Byters". A Double K-byter is a basic program which fits in 2K (2048 Bytes) of program memory. There aren't any restrictions on the nature of the program, other than its size. It can be a graphics display, a game, a mini-adventure, or anything that your imagination and programming skills can create.

Note that the program does not have to run in 2K of memory; it can use as much RAM for arrays, strings, graphic mapping, and others, as you need. We'd prefer that it be able to run on a 16K computer, but this is not an absolute limit.

Here are the official rules to this challenge:

1. The program must be written for the PET, VIC-20, CBM, or SuperPET, entirely in Basic (although it may create and call Machine Language routines).
2. The program must occupy no more than 2048 bytes of memory before running.
3. The program must be submitted on tape or disk, accompanied by your name, address, phone number, and a written description of its operation.
4. Winners will have their programs published in **Strictly Commodore** and will receive \$30 for their programming excellence.

Send submissions to:

Double K-Byters
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Calgary, Alberta,
Canada T3C 3M2

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Strictly Commodore is the bi-monthly software publication devoted entirely to VIC-20, PET, CBM, and SuperPET computers.

Our basic premise is that Commodore computers are fantastic machines, but they are useless and worthless without software. If you've owned a computer for any length of time, you'd believe it too. Fine. Where does one get software? Well, one could buy it if the specific needs were known. But if you want to build a large library of good programs, and you don't want to spend \$10,000 buying it, **Strictly Commodore** is where its at.

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Our publication regularly includes comprehensive Commodore information, programming hints and tips, a new products section, detailed reviews of major products, and other factual material of interest to the Commodore microcomputer community.

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Enter The Z8000

by P.J. Rovero

Commodore computer users have had few central processor adjustments to make in the past. In the midst of changing ROMs, keyboards, and screens it sometimes seemed that the 6502 was the only part of their systems that did not change from model to model. The picture has changed somewhat with Commodore's introduction of the 6509 and 6510 processors but these are basically 'souped up' 6502s. A number of other companies are bringing add-on Z80, 6809, and 68000 processors to market. These machines normally do not replace the 6502 but can be selected as an alternative.

A major change is in the wings. Soon after Commodore and Zilog announced a technology transfer agreement, Commodore selected the Z8000 as the chip to be used in their future 16-bit processors. The Z8000 processors are very capable, but complex and very much different than the familiar 6502.

Table 1 lists a few of the Z8000 characteristics. The Z8001 is the more complex of the two and is capable of directly addressing 48 MEGabytes of memory. The Z8002 addresses 'only' 448K. These memory figures may seem large but the prices are decreasing as fast as the need for more memory is increasing. The processors divide the total address space into 7 smaller address spaces. Separate instruction, data, and stack address spaces are provided in each of two modes. In the user mode certain opcodes are privileged or unavailable for use. This can be used to provide operating system or proprietary software security. Both processors have 64K bytes of input/output address space.

This form of memory segregation is new for microprocessors. Multiuser mini- and mainframe computers have developed these systems over the years in response to disruptions of operations caused by intentional or accidental interference between systems and user programs and data. Note also the huge (by current standards) stack address spaces. The large segregated stack is advantageous in implementing multi-user and concurrent operating systems, high level languages, and supporting extensive interrupt processing.

The instruction set of the Z8000 contains 414 variations of 110 instruction types. Ninety percent of the instructions use the 5 main addressing modes on 8, 16, or 32-bit data types. The processor has 16 16-bit registers which may be grouped into combinations of 8, 16, 32, or 64-bit registers. The numerous and flexible registers allow extensive data manipulation and calculation to be performed entirely within the register space with register addressing, which is usually the most time efficient addressing mode. Many Z8000 opcodes directly execute complex functions that would be coded as subroutines on most other processors. Instructions are available for string and block searches, comparisons, and transfers; division with both quotient and remainder result; and byte/code translation using tables. A group of opcodes has been reserved for the use of extended processing units. These are special purpose processors designed to relieve the CPU of such time intensive tasks as floating point arithmetic and local network communications.

The assembly language for the Z8000 is understandably complex. Learning it will be quite a challenge for those programmers now comfortable with the 6502. The mnemonics, register structure, and address spaces will at first complicate the task. Eventually the capabilities of the Z8000 will allow the programmer more freedom and less restrictions. The users of applications packages and high level languages will reap the benefits without such drastic adjustments.

As far as the Author can determine, Olivetti is currently the only manufacturer with a Z8000 computer and operating system 'on the street'. Whether Commodore uses the same or similar operating system remains to be seen. At this point there is no 'popular' Z8000 operating system.

Programmers who wish to learn about the Z8000 before Commodore's new generation of 16-bit computers are introduced should read the "Z8000 CPU User's Reference Manual" (Prentice-Hall, 1982).

Processor	Z8001	Z8002
Address Range Total	48M	448K
Address Space Each	8M	64K
Address Space I/O	64K	64K
Instruction Types	110	110
Total Instructions	414	414

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Your Commodore-64 computer is an exciting new machine, but unless it is computing away it might as well be a flower stand. O.K., you have written some things for it (it only took three hours of programming to have it correctly draw four concentric circles...). You may have even bought a few good programs for it but to get a large software library is extremely expensive and time consuming.

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Arcaders' Corner

Strictly Commodore is pleased to announce the creation of this new column to identify and honour the best arcade aces in the world who play arcade-type games on their Commodore computers.

We'll be adding to and up-dating the listings of high scores each issue based upon the information provided by our readers.

To have your gaming achievements recognized in this column, all you have to do is follow a few simple rules:

1. Every high score must be accompanied by a photograph of the TV screen showing the score. These photos do not have to be of publishable quality, just readable by our staff.
2. All photographs received become the property of **Strictly Commodore** and none can be returned.
3. Be sure to include your complete name and address. (We will print only the name and city in the magazine, but we may want to contact high scorers for helpful gaming hints.)
4. Mail your photograph of the high score along with your complete name and address to: **Strictly Commodore**, P.O. Box 7428, Station E, Calgary, Alta., Canada T3C 3M2.

We open this new column with a listing of the (rather humble) high scores our staff has achieved in several arcade-style games:

Kongo Kong	54,600	Roger Olanson, Calgary, Alta., Canada
Wallbanger	9,135	Dean Orton, Calgary, Alta., Canada
Millipede	5,438	Roger Olanson, Calgary, Alta., Canada
Exterminator	27,440	John Kipling, Calgary, Alta., Canada
Escape MCP	6th Level	John Kipling, Calgary, Alta., Canada
VIC Avenger	4,460	Roger Olanson, Calgary, Alta., Canada
VIC Alien	4,100	Roger Olanson, Calgary, Alta., Canada
Space Invaders (PET/CBM)	6,880	Winston Wong, Calgary, Alta., Canada

As we receive photographs from our readers, we will eventually develop a list comprising of the most popular arcade-style games.

New Products

The staff of **Strictly Commodore** has come to the decision that the previous rating system, which appeared in our Jan./Feb. 1983 issue, was too general. Therefore, we have decided to introduce a new five-star rating system which will follow the name of each product listed in this section. The new system is as follows:

★	Not Recommended
★★	Fair
★★★	Good
★★★★	Very Good
★★★★★	Excellent

Street Sweepers (for VIC-20)

★★★

You are a city worker and your job is to clean the streets. You must not be caught by your supervisor though, as he may find you are not doing a good job. Very fast machine language program with four different levels to the game. You have a choice between using keyboard or joystick. Victory Software Inc., 2027-AS.J. Russell Circle, Elkins Park, PA 19117.

Space Rescue (for VIC-20)

★

This is a relatively easy game in which you have to rescue three men, one at a time, from a prison chamber. You have to go through a maze of winding passages and moving walls. The technique to winning is to not hit any of the walls because if you do, you will be automatically sent back to the beginning of the maze. Wonderware, P.O. Box 1287, Jacksonville, OR 97530.

Galactic Crossfire (for VIC-20)

★★★★

This is an exciting, fast action game with five different levels of play. You are caught in an asteroid belt with robots, saucers, and asteroids attacking you from above and below. You have to destroy them all and then move on to the next wave of attackers. This is an addictive game for those players who enjoy non-stop action. MIS, 250 Fern Rock Way, Boulder Creek, CA 95006.

AntiMatter Splatter (for VIC-20)

★★

In this game you have one movable base which can fire at the barrels coming down at you. The more barrels you hit, the more points you get. But the more points you get, and the more barrels you let by, the less time you have to live. Nufekop, P.O. Box 156, Shady Cove, OR 97539.

Krazy Kong (for VIC-20)

★★

A very basic game that unfortunately does not resemble the arcade game DONKY KONG. The speed is very fast and the overall game is very difficult to play. The graphics and sound are only rated as fair. There is no multiple screens to this game. Nufekop, P.O. Box 156, Shady Cove, OR 97539.

Escape MCP (for VIC-20)

★★★★

An excellent challenging game that tests your logic, and thinking. The object of the game is to escape from different mazes and the creature that chases after you. There is one catch, however: the creature can maneuver over and through the maze walls! We personally found this game very competitive and rewarding, because of the urge to continue playing even after you don't succeed in escaping. Color graphics and sound are fairly well done for this game. Comm-Data Computer House, P.O. Box 325, Milford, MI 48042.

Handy Guides (for all computers)

★★★

Alfred Publishing Company has introduced six new programming language booklets that teach you Basic, Pascal, Cobol, Fortran, APL, and Lisp. These booklets are 50 to 60 pages long, include a glossary of terms at the back, and they feature a unique 11" by 4-1/4" format that opens flat for easy use. These booklets, costing \$2.95 each, are not written specifically for Commodore computers but the information they contain is useful to a wide audience. Alfred Publishing Co., 15335 Morrison Street, Sherman Oaks, CA 91403.

FingerTip Controller (for VIC-20)

★★★

The FingerTip Controller is a versatile 8-way directional unit that works just like a joystick. The controller has 5 arcade-quality soft-touch buttons which allow for rapid firing and fast directional changes. The unit is made of unbreakable plastic and has a 6-foot cable. It is designed to work with the VIC-20 computer and models are available for both right-handed and left-handed people. The FingerTip Controller costs \$19.95 and is available from KY Enterprises, 195 Claremont, Suite 288, Long Beach, CA 90803.

Program Pad (for VIC-20)

★★★

Program Pad is an important new aid for VIC-20 users who do their own programming and need assistance in mapping out the screen. Each pad contains 35 coding sheets which are divided into two areas. The larger area of each sheet is for coding and is formatted in two display screens. These screens can be used for program coding, display editing, or graphic layout. The smaller area to the right is for support information such as program name, variable list and programmable character generation. Program Pads are available for \$3.45 and can be ordered from Desert Charts, P.O. Box 810, Glendale, AZ 85311.

Video Extender (for VIC-20)

★★★★

The video extender (Model J-4021) is a six-foot extension cord designed to be used with either a paddle or a joystick without loss of response or control. This new extender cable is designed to allow the player to sit further from the console adding comfort and freedom of movement. Available from Zircon International, 475 Vandell Way, Campbell, CA 95008.

Sketch and Paint (for VIC-20)

★★★★

For those of you who want to create full colour art on your VIC-20 this program is a must. Sketch and paint will allow you to draw, erase, use sound, draw a box, draw a line, fill-in a closed area on the screen with the selected colour, inverse the screens colours, choose a screen colour, and clear the screen if you want to start again. To use this program, you need a joystick. The only drawback of Sketch and Paint is the fact that you cannot save any of the sketches onto disk or cassette. For more information, write to Comm-Data Computer House, P.O. Box. 325, Milford, MI 48042.

Ant Raiders (for VIC-20)

★

This program is a very simple version of Centipede, with the only exception that instead of shooting at a centipede, you shoot at an army of ants marching across your screen. This game was written in BASIC and you will probably fall asleep before clearing one wave. This program uses joystick and keyboard controls. JMC Software, 1025 Industrial Drive, Bezenville, IL 60106.

Delux 6 Pak (for VIC-20)

★★★

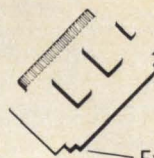
This package consists of six programs: WAR, Smashout, Blackjack, Logic, Pickupgame, and Alarm Clock. Although none of these programs alone is outstanding, together as six programs they will provide hours of enjoyment. WAR (you fight waves of enemy tanks), Smashout (a version of Breakout), and Blackjack (a version of the popular card game) are the most interesting of the six programs. Available from JMC Software, 1025 Industrial Drive, Bezenville, IL 60106.

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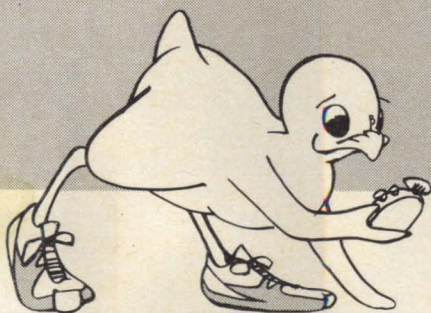
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